ALMADEN LAKE IMPROVEMENT PROJECT

Final Environmental Impact Report
SCH# 2014042041

Prepared for

Valley Water
Clean Water • Healthy Environment • Flood Protection

May 2021

ESA

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TABLE OF CONTENTS

Almaden Lake Improvement Project
Final Environmental Impact Report

Page

Acronyms and Abbreviations ..... **v**

Glossary ..... **xi**

Summary **S-1**

Chapter 1, Introduction **1-1**
- 1.A Purpose of the EIR 1-2
- 1.B EIR Process 1-3
- 1.C Organization of the ~~Draft~~ EIR 1-5
- 1.D References 1-6

Chapter 2, Project Description **2-1**
- 2.A Introduction 2-1
- 2.B Project Location 2-2
- 2.C Existing Facilities and Operations, Need and Objectives 2-2
- 2.D Project Description 2-7
- 2.E Project Construction 2-28
- 2.F Maintenance 2-48
- 2.G Intended Uses of the EIR and Required Permits and Approvals 2-50
- 2.H References 2-51

Chapter 3, Environmental Setting, Impacts, and Mitigation Measures **3-1**
- 3.A Aesthetics 3.A-1
- 3.B Agricultural and Forest Resources 3.B-1
- 3.C Air Quality 3.C-1
- 3.D Biological Resources 3.D-1
- 3.E Fisheries Resources 3.E-1
- 3.F Cultural and Tribal Cultural Resources 3.F-1
- 3.G Energy 3.G-1
- 3.H Geology and Soils 3.H-1
- 3.I Greenhouse Gas Emissions 3.I-1
- 3.J Hazards and Hazardous Materials 3.J-1
- 3.K Hydrology and Water Quality 3.K-1
- 3.L Noise 3.L-1
- 3.M Public Services 3.M-1
- 3.N Recreation 3.N-1
- 3.O Transportation 3.O-1
- 3.P Utilities and Service Systems 3.P-1

Page

Chapter 4, Alternatives....4-1
4.A Introduction....4-1
4.B Almaden Lake Improvement Project Alternatives Analysis....4-2
4.C Comparison of Alternatives....4-28
4.D Alternatives Considered but Rejected from Further Analysis....4-30
4.E References....4-49

Chapter 5, Cumulative Impacts....5-1
5.A CEQA Analysis Requirements....5-1
5.B Projects Considered in Cumulative Analysis....5-1
5.C Cumulative Impact Analysis....5-9
5.D References....5-33

Chapter 6, Other CEQA Issues....6-1
6.A Growth Inducing Impacts....6-1
6.B Significant Unavoidable Impacts....6-2
6.C Significant Irreversible Environmental Changes Which Would Be Caused by the Proposed Project Should It Be Implemented....6-2
6.D Mitigation Measures Proposed to Minimize Significant Effects....6-2

Chapter 7, Draft EIR Preparers....7-1
7.A Project Sponsor and Lead Agency....7-1
7.B Authors and Consultants....7-1

Appendices (*provided on CD*)

A. NOP and Scoping Period Public Meeting Comments
B. Air Quality and Greenhouse Gas Emissions (Revised)
C. Biological Resources
D. Geotechnical Report
E. Methyl Mercury Report
F. Noise
G. Response to Comments

List of Figures

2-1 Project Site (Revised)....2-3
2-2a Conceptual Site Plan: Almaden Lake (Revised)....2-9
2-2b Site Plan: Staging Areas and Site Access (Revised)....2-10
2-3 Project Cross Section....2-11
2-4 Almaden Valley Pipeline Alignment (Revised)....2-17
2-5 Outlet to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds ~~Alignment Options~~ (Revised)....2-19
2-6 Conceptual Revegetation Plan (Revised)....2-21
2-7 Conceptual Riffle and Pool Planting Details....2-24
3.A-1 Project and Photograph Viewpoint Locations....3.A-3
3.A-2 Site Views....3.A-4
3.A-3a Lake Almaden Trail – East Side; Visual Simulation of Project after Construction....3.A-19
3.A-3b Lake Almaden Trail – East Side Visual Simulation of Project after Eight Years....3.A-20
3.A-4a Lake Almaden Trail – Southwest Side; Visual Simulation of Project after Construction....3.A-21

Page

List of Figures (continued)

3.A-4b Lake Almaden Trail – Southwest Side; Visual Simulation of Project after Eight Years 3.A-22
3.A-5a Lawn Area near West Entrance; Visual Simulation of Project after Construction 3.A-23
3.A-5b Lawn Area near West Entrance; Visual Simulation of Project after Eight Years 3.A-24
3.A-6a Coleman Road; Visual Simulation of Project after Construction 3.A-25
3.A-6b Coleman Road; Visual Simulation of Project after Eight Years 3.A-26
3.C-1 San José Wind Rose 3.C-4
3.C-2 Approximate Location of MEI Receptor during Project Construction 3.C-25
3.D-1a Vegetation Communities and Habitat Types in the Project Study Area (Revised) 3.D-3
3.D-1b Vegetation Communities and Habitat Types in the Project Study Area (Revised) 3.D-4
3.D-2 CNDDB Species in the Project Area (Revised) 3.D-9
3.E-1 Average Temperatures at Lake Almaden 3.E-5
3.K-1 100-Year Flood Zone in the Project Vicinity (Revised) 3.K-4
3.K-2 Mercury Methylation Schematic 3.K-9
3.L-1 Decibel Scale and Common Noise Sources 3.L-2
3.L-2 Point Source Propagation (Spherical Spreading) 3.L-4
3.L-3 Noise Level Measurement Locations 3.L-6
3.N-1 Almaden Lake Park Recreation Features 3.N-2
3.O-1 Roadway Traffic and Daily Traffic Volumes (Revised) 3.O-3
3.O-2 Existing Transit Facilities (Revised) 3.O-5
3.O-3 Existing Bicycle Facilities (Revised) 3.O-7
4-1 Alternative 2: Creek with East and West Lakes 4-16
4-2 Alternative 3: Creek with East and West Open Spaces 4-23

List of Tables

S-1 Summary of Project Components S-3
S-2 Summary of Impacts and Mitigation Measures S-8
2-1 Summary of Project Components 2-8
2-2 Summary of Project Benefits to Waters of the State 2-28
2-32 Project Construction, Approximate Duration, Crew Size, Equipment, and Approximate Cut and Fill Volumes 2-42
2-43 Anticipated Permits and Approvals 2-51
3.A-1 Summary of Aesthetics Impacts 3.A-17
3.B-1 Summary of Agriculture and Forest Resources Impacts 3.B-6
3.C-1 Air Quality Data Summary (2015–2017) for the Project Area 3.C-6
3.C-2 Ambient Air Quality Standards and San Francisco Bay Area Air Basin Attainment Status 3.C-9
3.C-3 Summary of Air Quality Impacts 3.C-19
3.C-4 Total Average Daily Construction Emissions 3.C-22
3.C-5 Total Average Daily Mitigated Construction Emissions 3.C-22
3.C-6 Project Construction Health Risk Assessment Results 3.C-26
3.C-7 Mitigated Project Construction Health Risk Assessment Results 3.C-26
3.C-8 Cumulative Mitigated Project Health Risk Assessment Results 3.C-27

Page

List of Tables (continued)

3.D-1 Summary of Biological Resources Impacts 3.D-25
3.D-2 Impacts to Jurisdictional Wetlands, and Waters~~, and Riparian Communities~~ 3.D-34
3.E-1 Special-Status Fish Species with Potential to Occur in the Almaden Lake Study Areas 3.E-6
3.E-2 Summary of Fisheries Resources Impacts 3.E-16
3.F-1 Summary of Cultural and Tribal Cultural Resources Impacts 3.F-13
3.G-1 Summary of the Energy Resources Impact 3.G-7
3.H-1 Distances to Major Active Faults 3.H-3
3.H-2 Paleontological Potential Criteria 3.H-6
3.H-3 Summary of Geology and Soils Impacts 3.H-12
3.I-1 California GHG Emissions 3.I-2
3.I-2 Summary of Greenhouse Gas Emissions Impacts 3.I-12
3.I-3 Total Estimated GHG Construction Emissions 3.I-13
3.I-4 Total Estimated GHG Operation Emissions 3.I-13
3.I-5 Total Amortized GHG Emissions 3.I-14
3.J-1 Summary of Lake Bottom Sediment Chemical Results 3.J-3
3.J-2 Summary of Shoreline Soil Chemical Results 3.J-4
3.J-3 Summary of Hazards and Hazardous Materials Impacts 3.J-14
3.K-1 Freshwater Water Quality Objectives for Mercury in the Guadalupe River Watershed 3.K-13
3.K-2 Summary of Hydrology and Water Quality Impacts 3.K-20
3.L-1 Approximate Relationship between Increases in Environmental Noise Level and Human Perception 3.L-3
3.L-2 Summary of Ambient Noise Level Measurement Results 3.L-6
3.L-3 Existing Traffic Noise Levels Modeled for Area Roadways 3.L-7
3.L-4 OSHA-Permissible Noise Exposure Standards for Workers 3.L-8
3.L-5 Summary of Noise and Vibration Impacts 3.L-12
3.L-6 Typical Noise Levels from Construction Equipment 3.L-14
3.L-7 Anticipated Construction Period Noise Levels at Sensitive Receptor Locations 3.L-15
3.L-8 Baseline Plus Project Daytime Equivalent Noise Levels for Residences Nearest to Affected Project Roadways 3.L-16
3.M-1 Summary of Public Services Impacts 3.M-4
3.N-1 Almaden Lake Picnic Areas 3.N-4
3.N-2 Summary of Recreation Impacts 3.N-6
3.O-1 Existing Daily Traffic Volumes on Area Roadways 3.O-4
3.O-2 Summary of Transportation Impacts 3.O-10
3.O-3 Weekday Construction Conditions Trip Generation Summary (During 18-Day Overlap of Project Activities) 3.O-11
3.O-4 Existing and Existing Plus Project Daily Roadway Segment Volumes 3.O-13
3.P-1 Summary of Utilities and Service Systems Impacts 3.P-6
4-1 Selected CEQA Alternatives 4-6
4-2 Comparison of the Environmental Impacts of the CEQA Alternatives 4-9
4-3 Alternatives Considered but Rejected from Further Consideration 4-31
5-1 List of Projects Evaluated for Cumulative Impacts in the Almaden Lake Improvement Project Vicinity 5-2
5-2 Summary of Cumulative Impacts 5-9
5-3 Cumulative Mitigated Project Health Risk Assessment Results 5-13

ACRONYMS AND ABBREVIATIONS

°F	Fahrenheit
AB	Assembly Bill
ADMRT	Air Dispersion Modeling and Risk Tool
Af	acre-feet
afy	acre-feet per year
AMBAG	Association of Monterey Bay Area Governments
ANSI	American National Standards Institute
APE	Area of Potential Effects
APPWR	Alamitos Percolation Pond water right
ARB	California Air Resources Board
ASCE	American Society of Civil Engineers
BAAQMD	Bay Area Air Quality Management
BACT	Best available control technology
Bgs	Below Grand Surface
BMPs	Best Management Practices
BO	Biological Opinion
Board	Santa Clara Valley Water District Board of Directors
BRMs	Bedrock mortars
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Cal/OSHA	California Division of Occupational Safety and Health
CalARP	California Accidental Release Prevention
CalEEMod	California Emissions Estimator Model
CalEma	California Emergency Management Agency
CalFire	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CAP	Criteria air pollutants
CARB	California Air Resources Board
CASQA	California Stormwater Quality Association

CBC	California Building Code
CCC	Central California Coast
CCR	California Code of Regulations
CDC	California Department of Conservation
CDFW	California Department of Fish and Wildlife
CDSM	Cement Deep Soil Mixing
CEC	Constituent of Emerging Concern
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CGP	Construction General Permit
CGS	California Geological Survey
CH_4	Methane
CIWMA	California Integrated Waste Management Act
CIWMB	California Integrated Waste Management Board
CNPS	California Native Plant Society
CO	Carbon Monoxide
CO_2	carbon dioxide
CO_2e	CO_2-equivalent
CPUC	California Public Utilities Commission
CRPR	California Rare Plant Ranking system
CSC	County of Santa Clara
CUPA	Certified Unified Program Agency
CV	Central Valley
CVP	Central Valley Water Project
CWA	Clean Water Act
CY	Cubic yards
dB	decibels
dBa	A-weighted sound levels
DEH	Department of Environmental Health
DEIR	Draft Environmental Impact Report
District/Valley Water	Santa Clara Valley Water District
DLRP	Division of Land Resource Protection
DNL	Day-Night Average Level
DOGGR	Division of Oil, Gas, & Geothermal Resources

DOT	U.S. Department of Transportation
DPM	Diesel particular matter
DPM	Diesel Particulate Matter
DPR	California Department of Pesticide Regulation
DSOD	California Division of Safety of Dams
DTSC	California Department of Toxic Substances Control
EAP	California Energy Action Plan
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Environmental Science Associates
ESL	Environmental Screening Level
FAHCE	Fish and Aquatic Habitat Conservation Effort
FDOT	Florida Department of Transportation
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHSZs	Fire Hazard Severity Zones
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FMMP	Farmland Mapping and Monitoring Program
FTA	Federal Transit Administration
GHG	Greenhouse gas
GMP	Groundwater Management Plan
GWP	Global warming potential
HARP	Hotspot Analysis and Reporting Program
HCP	Habitat Conservation Plan
HFC	Hydrofluorocarbons
HOV	High-Occupancy Vehicle
HRA	Health risk assessment
HWCA	Hazardous Waste Control
Hz	Hertz
IBC	International Building Code
In/sec	Inches per second
IPCC	Intergovernmental Panel on Climate Change
IPR	Indirect potable reuse

IPR	Indirect Potable Reuse
JPA	Joint powers authority
KPIs	Key Performance Indicators
kWh	Kilowatt-hours
lake	Almaden Lake
LEDPA	Least environmentally damaging practicable alternative
L_{eg}	Equivalent Sound Level
LFGTE	Landfill-gas-to-energy
LID	Low Impact Development
L_{max}	Maximum Sound Level
LOS	Level of service
LS	Less than Significant impact, no mitigation required
LSAA	Lake or Streambed Alteration Agreement
LSM	Less than Significant impact with Mitigation
MBTA	Migratory Bird Treaty Act
MeHg	Methylmercury
MEI	Maximally exposed individuals
MMRP	Mitigation Monitoring and Reporting Program
Mph	Miles per hour
MRP	Municipal Regional Stormwater
MS4s	Municipal separate storm sewer systems
MSL	Mean sea level
MTC	Metropolitan Transportation Commission
Mw	Moment Magnitude
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan
Ng/L	Mercury per liter
NHPA	National Historic Preservation Act
NI	No Impact
NMFS	National Marine Fisheries Service
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOP	Notice of Preparation
NOx	Nitrogen oxides

NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NWIC	Northwest Information Center
OEHHA	State Office of Environmental Health Hazard Assessment
OES	State Office of Emergency Services
OSHA	Federal Occupational Health and Safety Administration
OSPH	Open Space, Parklands and Habitat
Park	Almaden Lake Park
PCE	Passenger car equivalent
PFC	Perfluorocarbons
PG&E	Pacific Gas and Electric Company
PM_{10}	Particulate matter less than 2.5
$PM_{2.5}$	Particulate matter less than 10 microns
Ponds	~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds
PPV	Peak particle velocity
PRC	Public Resources Code
Project	Almaden Lake Improvement Project
PSD	Prevention of Significant Deterioration
PWRPA	Power and Water Resources Pooling Authority
RARE	Rare and endangered species
RCRA	Resource Conservation and Recovery Act
RMS	Root mean square
ROG	Reactive organic gases
ROW	Right of Way
RPS	Renewable Portfolio Standard
RWQCB	San Francisco Bay Regional Water Quality Control Board
SB	Senate Bill
SBWR	South Bay Water Recycling
SCVHP	Santa Clara Valley Habit Plan
SDC	Seismic design category
SEL	Sound Exposure Level
SF_6	Sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan

SJFD	San José Fire Department
SJPD	San José Police Department
SJUSD	San José Unified School District
SLR	Single Lens Reflex
SMP	Stream Maintenance Program
SPCC	Spill Prevention Control and Countermeasure
SPL	Sound pressure level
SR	State Route
SU	Significant and Unavoidable impact
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
TC HCP	Three Creeks Habitat Plan
TIS	Traffic Impact Study
TMDL	Total Daily Maximum Load
TMP	Transportation Management Plan
TTLC	Total Threshold Limit Concentration
ug/L	Micrograms per liter
ug/m^3	Micrograms per cubic meter
uPa	Micro-Pascals
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	Decibel notation
VMT	Vehicle miles traveled
VTA	Santa Clara Valley Transportation Authority
WGCEP	Working Group on California Earthquake Probabilities
WILD	Wildlife habitat
WPCP	San Jose / Santa Clara Water Pollution Control Plant
WQO	Water quality objective

GLOSSARY

acre-foot/~~year~~: The amount of water that covers one acre of land one-foot-deep in water, which equates to 325,851 gallons.

Active site: An active site is a site that is currently undergoing investigation and/or cleanup activities.

Alluvium: Consists of unconsolidated mixtures of gravel, sand, clay, and silt typically deposited by streams.

Anadromous fish: A fish born in fresh water, that spends most of its life in the sea and returns to fresh water to spawn.

Anoxic: Areas of sea water, fresh water, or groundwater that are depleted of dissolved oxygen and are a more severe condition of hypoxia.

Aquifer: A geologic rock formation (or, group of rock formations or part of a formation) that contains groundwater in the spaces between sediment grains, in voids, or in fractures. Use of the term aquifer is usually restricted to those water-bearing formations capable of yielding water in sufficient quantity to constitute a usable supply source.

A-weighted decibel (dBA): Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called “A-weighting,” expressed as “dBA.” The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies.

Bathymetry: The measurement of depth of water in oceans, seas, or lakes.

Bioaccumulation: The accumulation of a substance, such as a toxic chemical, in various tissues of a living organism.

Bioconcentration: The process by with a chemical concentration in an aquatic organism exceeds that in the water as a result of exposure to a waterborne chemical.

Epilimnetic mixing: The mixing of the epilimnion layer (warmer, higher pH and dissolved oxygen surface layer of a thermally stratified lake) and the deeper hypolimnion layer (bottom layer of a thermally stratified lake).

Fishway: Another term for fish ladder; a contrivance for enabling fish to pass around a fall or dam in a stream.

Groundwater basin: An area underlain by permeable materials capable of furnishing a significant supply of groundwater to wells or storing a significant amount of water.

Groundwater replenishment/recharge: A hydrologic process in which water moves downward from surface water to groundwater.

Hazardous Materials: any item or agent (biological, chemical, radiological, and/or physical), which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.

Hybernaculum: The winter quarters of a hibernating animal.

Hypolimnetic anoxia: Deep-water depletion of dissolved oxygen which usually occurs in summer due to organic loading and stagnation of bottom waters.

Indirect Potable Reuse (IPR): Recycled water treated to drinking water standards, which is blended with other environmental systems such as river, reservoir, or in the case of the project, a groundwater basin, before the water is reused.

Iteroparous: a reproductive strategy that is characterized by an organism have multiple reproductive cycles over the course of its life.

Level of service (LOS): A qualitative description of a facility's performance based on average delay per vehicle, vehicle density, or volume-to-capacity ratios. Levels of service range from LOS A, which indicates free-flow or excellent conditions with short delays, to LOS F, which indicates congested or overloaded conditions with extremely long delays.

Methylmercury: any of various toxic compounds of mercury containing the complex CH_3Hg^- that often occur as pollutants which accumulate in living organisms (such as fish) especially in higher levels of a food chain

Microbial methylation: The biological mechanism for the removal of microorganisms, especially bacterium causing disease or fermentation, through the process of converting them to methyl derivatives that are removed by volatilization.

Moment Magnitude: Moment Magnitude (Mw) is related to the physical size of a fault rupture and movement across a fault. Moment magnitude provides a physically meaningful measure of the size of a faulting event (CGS, 2002b).

Percolation Pond: A pond that acts as a hold facility while gravity allows the water to percolate or seep through the soil or other unconsolidated medium into the local water table.

Perennial stream: a stream or river that has continuous flow in parts of its stream bed all year round during years of normal rainfall.

Public Views: Are those that are experienced from publicly accessible vantage points.

Pump Station: A facility used to move water against gravity from one location to another.

Riparian: The land adjacent to a natural watercourse such as a river or stream. Riparian areas support vegetation that provides important wildlife habitat, as well as important fish habitat when sufficient to overhang the bank.

Semelparous: a reproductive strategy that is characterized by an organism having a single reproductive episode before death.

Special-status species: Several species known to occur within the general region of the program area are accorded “special status” because of their recognized rarity or vulnerability to habitat loss or population decline. Some of these species receive specific protection in federal and/or state endangered species legislation. Others have been designated as “sensitive species” or “species of special concern” on the basis of adopted policies of federal, state, or local resource agencies. These species are referred to collectively as “special-status species.”

Strike-slip: Refers to relative motion on either side of a fault that is primarily horizontal (as opposed to vertical). If straddling the fault, the right side of a right-lateral fault would move towards the observer.

Subbasin: A structural geologic feature where a larger basin in divided into a series of smaller basins with intervening intrabasinals highs.

Tertiary treatment: Tertiary treatment is the advanced treatment process, following secondary treatment of wastewater, before it is recycled or discharged to the environment. Tertiary treatment includes removal of nutrients such as phosphorus and nitrogen and practically all suspended and organic matter from wastewater.

Upgradient: Similar to upstream, an Upgradient location is the source of groundwater to down gradient locations.

Urbanized Area: as defined by CEQA Guidelines Section 15387 ‘urbanized central city or a group of contiguous cities with a population of 50,000 or more, together with adjacent densely populated areas having a population density of at least 1,000 persons per square mile.’

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CHAPTER S
Summary

S.1 Introduction

The Santa Clara Valley Water District[1] (District) is proposing the Almaden Lake Improvement Project (Project) at Almaden Lake Park (Park) in the City of San José (City). The Project would separate Alamitos Creek from Almaden Lake (lake) within the footprint of the lake, in order to improve physical habitat for native fish and passage for anadromous fish, while improving water quality and minimizing impacts to existing recreational features in the Park. The proposed improvements would include modification of the existing contour of Almaden Lake, with restoration of a creek channel within the existing lake area. Other measures would protect the existing lake area to support habitat and recreational beneficial uses, while promoting the water quality objectives laid out by the San Francisco Bay Regional Water Quality Control Board (RWQCB) in its 2018 Basin Plan amendment.

Developed as a partnership between the City and the District in the late 1970s, Almaden Lake Park is a 65-acre recreational facility that includes the 32-acre Almaden Lake, and offers to the public miles of hiking trails, biking, picnic areas, volleyball, bocce ball courts, pedal boating, and other recreational activities. However, due to historic mining activities upstream of Almaden Lake and the lake's deep bathymetry, mercury-laden sediment has become trapped in the lake, resulting in considerable buildup of mercury in lake sediments. Driven by anoxic conditions at the lake bottom, microbial methylation of mercury has resulted in high levels of methylmercury in water and fish. The lake is also subject to other notable water quality issues, including high temperature, high bacteriological count, potentially toxic algae blooms, and low dissolved oxygen. By implementing the proposed changes, the District aims to reduce methylmercury generation and improve overall water quality. In this way, the Project would promote the ability of the District to improve conditions in the lake for fish, while minimizing impacts on existing recreational features.

The District is the lead agency responsible for California Environmental Quality Act (CEQA) environmental review of projects (sponsored) by the District. CEQA requires the preparation of an Environmental Impact Report (EIR) when a project could significantly affect the physical environment. The District determined that the Project could potentially cause significant environmental impacts, and that preparation of an EIR was therefore required for the Project to comply with CEQA.

[1] The Santa Clara Valley Water District changed its name to Valley Water (https://www.valleywater.org/). However, the majority of the environmental impact report was written prior to the agency's name change, and the Santa Clara Valley Water District's former name is retained herein.

The District has prepared this EIR to provide the District's Board of Directors (Board), the public, and responsible and trustee agencies reviewing this Project, with information about the potential physical effects, both beneficial and adverse, on the local and regional environment associated with implementation of the Project. This EIR was prepared in compliance with CEQA (California Public Resources Code, Sections 21000 et seq.), and the CEQA Guidelines (Code of Regulations Title 14, Chapter 3, Sections 15000 et seq.).

This EIR describes the Project under consideration by the District. The document characterizes the Project setting, discloses the range of potential environmental impacts of the Project, and identifies mitigation measures where those impacts would be significant. The EIR also addresses cumulative adverse impacts to which the proposed Project could make a substantial contribution. Also, as required under CEQA, it describes and evaluates potentially feasible alternatives to the Project that could avoid or reduce significant impacts while still meeting most of the Project's objectives.

The Draft EIR (DEIR) was published in December 2019. All written comments received on the adequacy of the DEIR during the public review period are addressed in a "response-to-comments" document (Appendix G) which, together with the Draft EIR, constitute the Final EIR (FEIR). The response-to-comments document also presents any changes to the DEIR resulting from public and agency input and District staff-initiated changes. None of the comments, responses, or DEIR revisions constitute "significant new information" that would require DEIR recirculation under CEQA Guidelines Section 15088.5.

S.2 Project Objectives

The Project purposes are to restore Alamitos Creek's function within the footprint of Almaden Lake Park in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint, and minimizing impacts to existing recreational features within the Park.

These purposes would be accomplished through the following objectives:

- Separate Alamitos Creek from Almaden Lake.
- Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives.
- Remove potential lake entrainment of anadromous fish.
- Improve temperature conditions and reduce predation for native fish.
- Minimize impacts to existing recreational features.

Separating Alamitos Creek from Almaden Lake would restore Alamitos Creek's upstream and downstream connectivity within the Guadalupe River Watershed, restoring habitat linkages for native fish and ~~threatened~~ anadromous fish species, and would create a geomorphically stable creek channel that would improve sediment transport and restore

natural creek functions. Therefore, the Project would help to restore and maintain healthy fish populations by improving fish habitat and passage in the creek channel.

Leveling the irregular lake bottom ~~(remnant of past gravel quarry operations)~~ and capping existing elemental mercury in the lake bed ~~soils~~ would assist in addressing Almaden Lake's mercury-related water quality issues. Re-contouring the lake bottom, continuing effective control measures (e.g., operation of SolarBee solar powered circulators) to manage future methylmercury production and bioaccumulation in fish, and utilizing a water source that minimizes the reintroduction of mercury to the lake would promote the ability of the District to meet the water quality objectives laid out by the RWQCB in the 2008 Basin Plan Amendment (RWQCB, 2008).

S.3 Summary of Project Description

The proposed Project includes separating Alamitos Creek from the lake and restoring its upstream and downstream connectivity; re-contouring the lake bottom and capping it with clean fill; expanding the Park into the existing lake and beach areas~~,~~; expanding the existing island and constructing a new island~~,~~; ~~revegetating the area with native~~ establishing vegetation~~,~~; and ~~developing a flow-through water system to circulate water through the lake by~~ connecting the lake via pipeline to an imported water source~~.~~ ~~and pumping water from the lake via pipeline to the Los Alamitos Percolation Pond for groundwater recharge.~~ Table S-1 below summarizes the Project components.

TABLE S-1
SUMMARY OF PROJECT COMPONENTS

Project Element	Description
Alamitos Creek Restoration	Separation of Alamitos Creek from the lake area
	Construction of a geomorphically stable, self-sustaining channel for Alamitos Creek
	~~11~~ 10 acres of restored creek area
	20-foot wide levee along top with maintenance road and public trail
	Construct ~~two~~ three maintenance access ramps into new creek area
Almaden Lake Separation	Separation of the lake area from Alamitos Creek
	~~17~~ 15 acres of lake water surface area
	Reshaping of remaining lake bed and capping of mercury-laden sediment with clean clay
	Relocation of the boat launch ramp and boat house
Open Park Area Expansion	Addition of approximately 2 acres of open park area at the existing west beach and lake area
Island Areas Expansion and New	Expansion of existing island to 0.75 acres and construction of new 0.75 acre island
Almaden Lake Source Water Connection	Supplying of source water to the lake to maintain a water level between 188 feet and 190 feet above msl (consistent with existing conditions). Water would be supplied from the Almaden Valley Pipeline, which would provide imported raw water for use in the lake
Almaden Lake Connection to ~~Los~~ Alamitos Percolation Pond	Pumping Almaden Lake water via an outlet structure into a new pipeline connecting to ~~Los~~ Alamitos Percolation Pond or Los Capitancillos Percolation Ponds for circulation.
Vegetation Installation	Installation of riparian vegetation along both sides of the new levee, west bank of the restored creek, and the islands

The key Project elements under consideration (Alamitos Creek restoration, Almaden Lake separation, open park area expansion, island areas, Almaden Lake source water connection, Almaden Lake connection to ~~Los~~ Alamitos Percolation Pond, and native revegetation) are presented in more detail in Chapter 2*,* Project Description. The District is presently considering two alignment options for the Almaden Lake connection to ~~Los~~ Alamitos Percolation Pond.

S.4 Summary of Impacts and Mitigation Measures

Table S-2 summarizes the impacts of the Project. For each impact considered to be significant or potentially significant, the table summarizes the recommended mitigation measures. Table S-2 is intended to provide a summary of the Project impacts and mitigation measures that are described in detail in Chapter 3*,* Environmental Setting, Impacts, and Mitigation Measures and Chapter 5, Cumulative Impacts*;* please refer to those chapters for a complete discussion of impacts.

S.5 Summary of Project Alternatives

This information can be found in Chapter 4, Alternatives, and presents the alternatives analysis for the Almaden Lake Improvement Project. Chapter 4, Alternatives sets forth the objectives of the Project, summarizes the Project's significant environmental impacts, describes the range of alternatives considered, compares the impacts of the alternatives evaluated to the impacts of the Project, and discusses the alternatives considered but eliminated from further analysis.

The State CEQA Guidelines, Section 15126.6(a), state that an EIR must describe and evaluate a reasonable range of alternatives to the project that would feasibly attain most of the project's basic objectives, but that would avoid or substantially lessen any significant adverse effects of the project. An EIR is not required to consider every conceivable alternative to a project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. The CEQA Guidelines further state that the specific alternative of "no project" shall also be evaluated. The EIR must evaluate the comparative merits of the alternatives and include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the impacts of the project.

The reasonable range of alternatives that would be able to attain most of the Project's objectives but also avoid or lessen any of the Project's significant environmental effects are summarized below.

S.5.1 Alternative 1: No Project

CEQA Guidelines Section 15126.6(e) requires that EIRs include an evaluation of the No Project Alternative to provide decision-makers the information necessary to compare the relative impacts of approving the Project and not approving the Project. The No Project

Alternative is defined as a continuation of existing conditions, as well as conditions that are reasonably expected to occur in the event that the proposed Project is not implemented.

In the event that the District does not approve the Project, the restoration of Alamitos Creek and Almaden Lake would not occur. The open area in the Park and the existing island in the lake would not be expanded, and the additional island would not be created. The flow-through water management system from Almaden Valley Pipeline to the ~~Los~~ Alamitos Percolation Pond would not be constructed. Restoration of levees, banks, and islands would not occur. Without these components in place, existing thermal barriers to anadromous fish would remain in place and anadromous fish would continue to be subject to predation by warm water predators in the lake. Finally, the lake would continue to experience high concentrations of coliform bacteria and blue-green algae blooms. Current prohibitions on water-based activities at and in the lake would remain in force based on water quality testing. This alternative would not meet any of the project objectives.

S.5.2 Alternative 2: Creek with East and West Lakes

The intent of Alternative 2 would be to reduce the short-term, construction-related impacts of the Project while fulfilling the project objectives. Alternative 2 would include the separation of Alamitos Creek from Almaden Lake, and the re-contouring and capping of the lake bottom. However, Alternative 2 would feature open water lake areas on both sides of the restored Alamitos Creek alignment, instead of a single lake to the east of the creek and new parkland to the west of the creek as proposed under the Project.

Because the West Lake area would be open water and not new park land, the amount of required fill would be reduced by nearly 70,000 cubic yards (from about 897,690 cubic yards under the Project [see Table 2-2 in Chapter 2, Project Description]). In addition, the construction period under Alternative 2 would be approximately 4 months less than under the Project (26 months as compared to 30 months under the Project), and construction-related impacts would be proportionately reduced. Alternative 2 would meet all of the project objectives.

S.5.3 Alternative 3: Creek with East and West Open Space Alternative

The intent of Alternative 3 would be to reduce tree removal within the park ~~eliminate the operational noise impact of the pump station under the Project while fulfilling the project objectives.~~ Alternative 3 would restore the Alamitos Creek alignment in a 5-acre corridor, and would address ongoing water quality issues in Almaden Lake by filling the lake and creating new park/open space areas to the east and west of the creek, instead of a single lake to the east of the creek and new parkland to the west of the creek as proposed under the Project.

The entire lake area would be converted to open space park land, with the exception of the 5-acre Alamitos Creek channel. In addition, the new park area to the west of the creek would more than double in size from approximately 2 acres under the Project to approximately

5 acres under Alternative 3. Given the increase in open space proposed under this alternative, Alternative 3 would require approximately 100,000 cubic yards more fill material than the Project. Even though the Alternative would not require construction of the transfer pipeline, placement of a considerable amount of additional clean fill to fill Almaden Lake would require a longer construction period than the Project, and construction-related impacts would be proportionately increased. Alternative 3 would partially meet project objectives.

S.5.4 Comparison of Alternatives and Environmentally Superior Alternative

The State CEQA Guidelines Section 15126.6(e) requires the identification of an environmentally superior alternative to the proposed project. To determine the environmentally superior alternative, the impacts of all the alternatives were compared to determine which alternative would have the least adverse effects:

- Alternative 1 would eliminate the short term construction effects relative to the proposed project. However, under Alternative 1 the existing water quality issues would continue, including mercury contamination (which is in exceedance of RWQCB water quality standards), low dissolved oxygen, coliform bacteria, and algal blooms. Numeric targets for fish tissue mercury concentrations would continue to be in exceedance of mercury thresholds. Also, existing barriers to anadromous fish migration would continue.

- Alternative 2 would reduce the short-term construction effects relative to the Project by utilizing approximately 70,000 cubic yards less fill material resulting in an approximately 4-month shorter construction period than the Project. However, ground disturbance associated with pipeline construction would be somewhat greater under this alternative (to provide a flow-through system for two separate lakes), potentially creating additional short-term disruptions of habitat. Additionally, Alternative 2 would require two pump stations to convey water to ~~Los~~ Alamitos Percolation Pond, although due to the smaller size of the pumps, operational noise levels would be similar to the Project

- Alternative 3 ~~would eliminate the operational noise impact of the pump station under the Project, but in converting the lake to park land,~~ would require approximately 100,000 cubic yards more fill material than the Project <u>to convert the lake to park land</u>, which would require a longer construction period than the Project, and construction-related impacts would be proportionately increased.

Among the action alternatives, Alternative 2 is the environmentally superior alternative. While Alternative 1 reduced the environmental impacts from the Project, it was not chosen since it is a No Project Alternative that did not achieve the project objectives. ~~While Alternative 3 eliminated the operational noise impact of the pump station under the Project, this alternative increased the short-term construction-related impacts as compared to the Project.~~

Alternative 2 would decrease the short-term, construction-related impacts as compared to the Project, resulting in reduced construction-related impacts to aesthetic resources, air quality, biological resources, energy resources, hydrology and water quality, and noise-related impacts. Ground disturbance associated with pipeline construction would be somewhat greater under this alternative to provide a flow-through system for two separate

lakes, potentially creating additional short-term disruptions of habitat. Alternative 2 would also require two pump stations, however, the two pump stations would have a smaller capacity than the pump station proposed under the Project due to the reduced pumping requirements of the two lakes under Alternative 2. As a result, the noise generated by the two pump stations under Alternative 2 would be similar to the operational noise of the proposed Project's pump station. As a result, Alternative 2 would have reduced construction-related impacts as compared to the Project and Alternative 3, and similar operational noise impacts as the Project, and on balance would be the environmentally superior alternative.

S.6 Areas of Controversy and Issues to be Resolved

Pursuant to Section 15123(b)(2) of the CEQA Guidelines, an EIR shall identify areas of controversy known to the lead agency, including issues raised by agencies and the public and the issues to be resolved.

During the planning process, the District discussed several options for the Project site to separate Alamitos Creek from Almaden Lake, address the water quality issues of the lake and the regulatory requirements of anadromous fish passage, and meet the project objectives. Some preliminary options considered a substantially reduced lake footprint. Project stakeholders raised concerns about a substantially reduced lake feature at the Park. In addressing public concerns, the District developed a conceptual site plan that meets project objectives, and retains a sizeable lake feature at Almaden Lake Park.

There are no issues to be resolved other than the choice among alternatives and choice of mitigation measures (CEQA Guidelines Section 15123(b)(3).

TABLE S-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Aesthetics		
Impact 3.A-1: The proposed Project would not have a substantial adverse effect on a scenic vista.	LS	No mitigation required.
Impact 3.A-2: The proposed Project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway or other designated corridor.	LS	No mitigation required.
Impact 3.A-3: The proposed Project would substantially degrade the existing visual character or quality of public views of the site and its surroundings and would not conflict with applicable zoning and other regulations governing scenic quality.	SU	No mitigation available.
Impact 3.A-4: The proposed Project would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	LS	No mitigation required.
Impact 5.A: Cumulative impacts on scenic resources (vistas, roadways, and designated scenic areas), scenic resources, or the visual character of public views of the Project area and its vicinity, or substantially increase light or glare in the Project area and its vicinity.	SU	No mitigation available.
Agricultural and Forest Resources		
Impact 3.B-1: The Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency to non-agricultural use.	LS	No mitigation required.
Impact 3.B-2: The Project would not conflict with existing zoning for agricultural use, or a Williamson Act contract.	LS	No mitigation required.

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Agricultural and Forest Resources (cont.)		
Impact 5.B: Cumulative effects on agriculture resources during construction.	LS	No mitigation required.
Air Quality		
Impact 3.C-1: The Project would conflict with or obstruct implementation of the applicable air quality plan.	LSM	Mitigation Measure 3.C-1a: *U.S. EPA Tier 4 Engines*. The Santa Clara Valley Water District and/or its construction contractors shall be required to use off-road diesel construction equipment compliant with U.S. EPA Tier 4 nonroad engine standards. Prior to the commencement of construction activities, the construction contractor and/or the Santa Clara Valley Water District shall prepare an equipment list that identifies each piece of off-road equipment to be operated at the Project site by its equipment identification number (EIN) and demonstrates that each piece of equipment meets U.S. EPA Tier 4 nonroad engine standards. The list shall be made available at the construction site and shall be updated when new or replacement construction equipment are brought to the site. Mitigation Measure 3.C-1b: *BAAQMD Basic Construction Measures*. The Santa Clara Valley Water District and/or its construction contractors shall comply with the following applicable BAAQMD Basic Construction Mitigation Measures: BAAQMD Basic Construction Measures 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. 2. All haul trucks and railcars transporting soil, sand, or other loose material off-site shall be covered. 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. 4. All vehicle speeds on unpaved roads shall be limited to 15 mph. 5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. 6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. 7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator. 8. Post a publicly visible sign with the telephone number and person to contact at Santa Clara Valley Water District regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Air Quality(cont.)		
Impact 3.C-2: The Project would result in a cumulatively considerable net increase of a criteria pollutant for which the SFBAAB is in non-attainment under applicable federal and state ambient air quality standards.	LSM	Implement Mitigation Measures 3.C-1a and 3.C-1b.
Impact 3.C-3: The Project would expose sensitive receptors to substantial pollutant concentrations.	LSM	Implement Mitigation Measures 3.C-1a and 3.C-1b.
Impact 3.C-4: The Project would not result in emissions that lead to odors affecting a substantial number of people.	LS	No mitigation required.
Impact 5.C: Cumulative emissions of air pollutants.	LSM	Mitigation Measure 3.C-1a: *U.S. EPA Tier 4 Engines.* Mitigation Measure 3.C-1b: *BAAQMD Basic Construction Mitigation Measures*.
Biological Resources		
Impact 3.D-1: Construction or operation of the Project could have a substantial effect on special-status birds, common nesting migratory birds and raptors, and roosting bats in the Study Area.	LSM	Mitigation Measure 3.D-1a: *Nesting Bird Protection Measures*. The District and/or its contractor(s) shall implement the following during construction of the proposed Project: • Removal of trees and scrub vegetation shall occur outside the bird nesting season (January 15 ~~February 1~~ to September 1 ~~August 31~~), to the extent feasible. • If removal of trees and vegetation cannot be fully accomplished outside of nesting season, a qualified biologist shall conduct preconstruction nesting surveys within seven days prior to the start of such activities or after any construction breaks of seven ~~10~~ days or more. Surveys shall be performed for the Study Area and suitable habitat within 250 feet of the project site to locate any active raptor (birds of prey) nests or rookeries. • If active nests are located during the preconstruction bird nesting survey, the qualified biologist shall evaluate if the schedule of construction activities could affect the active nests and the following measures shall be implemented based on their determination: – If construction is not likely to affect the active nest, it may proceed without restriction; however, a biologist shall regularly monitor the nest to confirm there is no adverse effect and may revise their determination at any time during the *nesting* season. In this case, the following measure would apply. – If construction may affect the active nest, the biologist shall establish a no disturbance buffer in consultation with CDFW. Typically, these buffer distances are 50 feet for passerines and between 300 feet for raptors. These distances may be adjusted depending on the level of surrounding ambient activity (e.g., if the project area is adjacent to a road or active trail) and if an obstruction, such as a building, is within line-of-sight between the nest and construction. For bird species that are federally and/or state-listed sensitive species (i.e., fully protected, endangered, threatened, species of special concern), a District ~~or City~~ representative, supported by the qualified biologist, shall coordinate with the USFWS and/or CDFW regarding modifications to nest buffers, prohibiting construction within the buffer, modifying construction, or removing or relocating active nests that are found on the site.

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Biological Resources (cont.)		
Impact 3.D-1 (cont.)		– Any birds that begin nesting within the project area and survey buffers amid construction activities are assumed to be habituated to *construction*-related or similar noise and disturbance levels. Qualified biologist, shall coordinate with the USFWS and/or CDFW and determine if no work exclusion zones shall be established around active nests in these cases. Mitigation Measure 3.D-1b: *Protective Measures for Bats*. The District shall engage a qualified biologist to conduct a habitat assessment for suitable bat roost habitat features, followed by a preconstruction survey(s) of the Project area as needed in order to locate active colonies and/or special-status species, conducted in an appropriate timeframe in advance of initiation of tree trimming or removal, or disturbance to other potential roost features, and to plan work accordingly to avoid or minimize impacts. The preconstruction survey should include at a minimum: a) identification of potential direct and indirect Project-related disturbing activities; b) locations of potential roost habitat features; c) species identification and locations of active bat colonies or special status bats within or adjacent to the Project area, along with estimated numbers when possible; and d) a description of protective measures to be implemented prior to construction. No Project-related activities that could disturb active roosts shall proceed prior to the completed surveys. Should special-status bats be found in trees or structures to be disturbed under the proposed Project, or it is determined by a qualified biologist that Project activities would result in significant impacts to bats, the following measures shall be implemented: • Removal of trees shall occur when bats are active, approximately between the periods of March 1 to April 15 and August 15 to October 15; outside of bat maternity roosting season (approximately April 15 – August 31); and outside of months of winter torpor (approximately October 15 – February 28), to the extent feasible. • If removal of trees or disturbance to other roost features during the periods when bats are active is not feasible and active bat roosts being used for maternity or hibernation purposes are found within or in the immediate vicinity of the Project area where tree removal or other disturbance is planned, an appropriate no-disturbance buffer, determined by a qualified biologist, shall be established around the roost sites until they are determined to be no longer active by a qualified biologist. If special-status bats are identified, CDFW shall be contacted for further guidance. • The qualified biologist shall be present onsite to monitor during tree or habitat feature disturbance if active bat roosts are present. • Removal of trees containing or suspected to contain active bat roosts shall be removed under the supervision of the qualified biologist on the second day of a two-day removal process. Trees shall be removed through a two-phase process to significantly change the roost conditions by trimming branches during the first phase, causing bats, if present, to abandon the roost at night, before completely removing the tree on the second day. Trees with active roosts shall be removed only when no rain is occurring or is forecast to occur for three days, and when daytime temperatures are at least 50˚F. • If there are significant impacts to bat roosting habitat (e.g., maternity roosts or hibernacula of sensitive or special -status species, or large non-maternity roost sites of sensitive species, or any number of special status species) due to project activities, a qualified biologist experienced in successful bat mitigation techniques shall develop a Bat Avoidance Plan including adequate buffer zones and/or other requirements to minimize the impact to the roosting site.
Impact 3.D-2: Construction or operation of the Project would not have a substantial effect on California red-legged frog, foothill yellow-legged frog, and western pond turtle in the Study Area.	LS	No mitigation required.

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Biological Resources (cont.)		
Impact 3.D-3: The proposed Project would not have a substantial adverse effect on riparian communities.	LS	No mitigation required.
Impact 3.D-4: The Project would not have substantial adverse effects on jurisdictional wetlands, other Waters of the United States and Waters of the State.	LS	No mitigation required.
Impact 3.D-5: The Project would not interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	LS	No mitigation required.
Impact 3.D-6: The Project could conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	LSM	Mitigation Measure 3.D-6: *Tree Protection Measures*. Trees adjacent to the project area that are retained during construction can still experience irreparable damage to roots and other tree parts with excavation, compaction, mechanical injury, and/or over pruning for construction access. • Construction impacts shall be evaluated and planned to avoid locally native trees and other trees protected by City code. A site meeting with contractor, certified arborist, and other project personnel shall be conducted prior to construction to discuss tree protection measures and specific tree resources. The construction contract must include the on-call services of qualified arborist. • All pruning work shall be conducted or directly overseen by a certified arborist. All pruning shall be done in accordance with ISA "Tree Pruning Guidelines" and/or the ANSI A300 Pruning Standards. Pruning of limbs and roots shall be minimized and conducted during cool, dry weather outside the active growing season when feasible. Access needs and equipment clearance shall be determined well in advance of construction to help schedule required pruning work at a time that is least detrimental to the tree species involved. • Pruning of more than 25% of an individual tree's canopy or crown in a single season shall be avoided. Removal of live limbs greater than 4 inches in diameter shall be avoided if possible or receive prior approval by a certified arborist. Selective removal of tree limbs for equipment access is always preferable to mechanical injury or incidental contact of equipment with tree parts during construction. Some branches may be tied back temporarily, rather than removed, to facilitate site access. • Establish a "Tree Protection Zone" (TPZ) around trees retained in the project area during construction. The TPZ shall be clearly marked and defined in the field using fencing or similar access deterrent and should be determined by the City's Arborist, or the Project designated ISA Certified arborist. No grading, compaction, excavation, soil storage, equipment storage, hazardous material storage, removal of understory vegetation, or equipment operation shall be conducted in the TPZ. • Any grading, construction, demolition, or excavation work that may encounter live tree roots (from trees scheduled for retention in Project area) shall be monitored by a certified arborist. Roots may extend beyond the canopy dripline or there may be insufficient space available for an adequate TPZ. Compaction of undisturbed native soils shall be considered as part of root area impacted by construction.

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Biological Resources (cont.)		
Impact 3.D-6 (cont.)		• When larger roots (>2-inch diameter) are encountered during construction, excavations shall only continue by hand or with smaller, hand-held tools (e.g. air spade) until sufficient root area has been exposed to cut it cleanly with a sharp instrument (e.g. pruning saw, cut-off saw, loppers) to remove the portion overlapping the construction area. Root pruning shall by conducted by or under direct supervision of a certified arborist. • If feasible, root pruning along the outside edge of a trench or other excavation shall be conducted prior to construction utilizing a combination of small equipment (i.e. trencher, small backhoe, cut-off saw) and hand tools. This "pre-pruning" gives the trees a chance to adapt to root loss prior to construction and develop new feeder roots that aid in water absorption. • All tools used for pruning of tree roots or limbs shall be kept sharp and regularly disinfected to discourage the spread of plant pathogens.
Impact 5.D: Cumulative loss of sensitive biological resources during construction and operations.	LSM	Mitigation Measure 3.D-1a: *Nesting Bird Protection Measures.* Mitigation Measure 3.D-1b: *Protective Measures for Bats.* Mitigation Measure 3.D-6: *Tree Protection Measures*
Fisheries Resources		
Impact 3.E-1: Construction and operation of the Project would have a substantial effect on special-status native fish and their aquatic habitat in Almaden Lake and Alamitos Creek	LSM	Mitigation Measure 3.E-1: *Native Fish Capture and Relocation*. The District and/or contractor shall implement a fish relocation plan consistent with the following conditions: • Before fish rescues are attempted resource agency authorization shall be obtained • Upon arrival at the site, qualified biologists shall determine the extent of the dryback and if there shall be any immediate or foreseeable impacts to fish and wildlife. This includes a reconnaissance survey of the dryback zone to establish an operational response. • Before dewatering can begin, the following fish relocation elements shall be determined: – *Staging Area*: Identify staging areas in the dryback zone. Sites should be selected on the basis of proximity and access to the dryback zone and safe operation of the equipment. – *Relocation Sites*: Priority shall be given to close proximity to the dryback zone within the same stream; if it is determined by a qualified on-site biologist that no suitable site within the stream is available, then "second choice" locations within the watershed shall be selected. In all cases, the closest site that is likely to result in a successful rescue shall be used. – *Transportation Routes*: Transport routes for rescued fish species shall be determined in advance. – *Downstream vs. Upstream*: Species rescued shall be transported downstream if possible and upstream only for short distances if downstream sites are not feasible. – *Disease Consideration*: Fish shall not be moved upstream over substantial barriers or long distances upstream to guard against disease transmission. • *Salmonids*: If salmonids are encountered during relocation, they should be moved upstream to a location of perennial running water or the best available habitat determined by a qualified biologist. Collection and transport methods shall be determined per site conditions. Methods shall also be selected to maximize efficiency of collection effort while minimizing handling and transport time and stress. Creek water from the site shall be used in all containers. Local transport of fish may be executed by various methods including:

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Fisheries Resources (cont.)		
Impact 3.E-1 (cont.)		– *Net transfer*: Appropriate for short distances where rapid transfer is possible. – *Live car*: Appropriate for temporary holding in stream and short distances where rapid transfer is required. – *Bucket*: Appropriate for temporary holding and transport over short-medium distances. Holding time should be minimized if possible or supplemental aeration supplied. – *Aerated cooler*: Appropriate for temporary holding and transport of long distances. Temperature shall be maintained similar to source creek water, and if necessary fish shall be sorted by size to reduce risk of predation. • Prioritization of species and collection/relocation sites to be prioritized as follows: – Endangered species – Threatened species – Species of special concern – Native fishes not under the above categories – Non-native fishes if appropriate • Notify Resource Agencies: Identify a point person to contact at appropriate resource agencies (CDFW, NMFS, and USFWS). At least 24 hours in advance, notify appropriate resource agencies to communicate the details of the fish relocation and to confirm disposition instructions. • Fish relocation shall be conducted in concurrence with the following conditions: – *Setup*: Upon arrival at the site, review the operational sequence and logistics and designate field assignments. Conduct a review of safety and operational methods. – *Live well Operation*: If necessary, set up live wells early in the operation in order to stabilize tank conditions. • Use local “native” water to fill live wells if available and clean • To lessen stress on fish, reduce or manage temperature in live wells to be compatible with the water temperatures in which the fish were encountered. • Start the aeration system prior to placing fish into the live well to ensure that sufficient oxygen is present during the adjustment period. When salmonids are placed in the live well, managed the live well to the extent possible so that the dissolved oxygen concentration shall be greater than 6 mg/l but less than saturation. – *Electrofishing Operation*: Adjust the electrofishing unit settings to the conductivity and temperature of the water. Adjust setting for either varying width (wide to narrow) or varying frequency (high to low) to minimize possible fish injury when these settings elicit proper taxis for fish capture. • Record the settings used and any incidental electrofishing mortalities in the field notebook. If electrofishing mortalities for salmonids and other species listed as threatened or endangered exceed 5% of the total capture, electrofishing activities shall be reevaluated and possibly terminated. • Note fish other than salmonids that are mortalities from electrofishing activities shall be used as an indicator of possible injury or mortality rate to salmonids and other fish. – *General Collection Guidelines*: Execute collection of fish in a manner to minimize handling time and stress, yet maintain the safety of personnel.

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Fisheries Resources (cont.)		
Impact 3.E-1 (cont.)		• Use multiple buckets and/or live cars to reduce crowding during collection and transfer. • Pre-sort fish as needed for transport. • Equip buckets that hold salmonids with portable aerators until subsequent transfer to a live well. • *Transport*: Transport fish to minimize holding time an alternately sequenced in tandem with ongoing collection activities. • Continue normal live well operations during transport. – *Records and Data*: Inventory fish and record other pertinent data, including species, numbers of each species, disposition, and other data such as fork length. If conditions preclude a complete inventory, at a minimum, document species present, their disposition, and an estimate of their abundance. • Record information on ambient site conditions (available habitat/water quality), including photo documentation at collection and release sites, as appropriate and other information on collection, handling, and transport. • At completion, conduct an assessment of the fish relocation to identify lessons learned, estimate the number of individual fish and fish species moved and determine the mortality rate. Report shall be forward to the appropriate resource agencies and interested parties.
Impact 3.E-2: Construction and operation of the Project would not interfere substantially with the movement or migration of native fish species, including CCC steelhead DPS.	LS	No mitigation required.
Impact 3.E-3: The Project would not conflict with any local policies or ordinances protecting fisheries resources or with an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.	LS	No mitigation required.
Impact 5.E: Cumulative loss of special-status native fish species and their aquatic habitat during construction and operations.	LSM	Mitigation Measure 3.E-1a: *Native Fish Capture and Relocation*.

LS = less than significant; LSM = Less than Significant with Mitigation; SU = significant and unavoidable.

TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Cultural Resources and Tribal Cultural Resources		
Impact 3.F-1: The Project would cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5, human remains, including those interred outside of formal cemeteries, or a tribal cultural resource as defined in PRC Section 21074.	LSM	Mitigation Measure 3.F-1a: *Preconstruction Training and Cultural Resources Monitoring*. Prior to construction, a qualified archaeologist shall prepare a cultural resources monitoring plan. The District shall review and approve the plan. The plan shall include a requirement for monitoring of construction activities within 200 feet of archaeological sites CA-SCL-~~132~~402 and CA-SCL-182 by a qualified archaeologist and, if reasonably available, a Native American representative. The plan shall include (but not be limited to) the following components: • A training program for all construction and field workers involved in site disturbance that would be completed prior to the commencement of construction activities and that would train site workers in the identification of cultural resources, and actions to be undertaken in the event that cultural resources are discovered; • The identification of person(s) responsible for conducting monitoring activities, including Native American monitors; • The identification of person(s) responsible for overseeing and directing the monitors; • Monitoring protocols and procedures, including the ability of the monitor to stop work within 100 feet of the find, and the required format and content of monitoring reports; • The schedule for submittal of monitoring reports and identification of person(s) responsible for review and approval of monitoring reports; • A protocol for notifications in the event cultural resources are encountered, as well as methods of ~~dealing with the~~ avoiding or minimizing impacts to the encountered resources (e.g., collection, identification, curation) consistent with CEQA Guidelines Section 15126.4(b)(3); • Methods to ensure the security of cultural resources sites; and • A protocol for notifying local authorities (i.e. Sheriff, Police) should site looting and other illegal activities occur during construction. During the course of the construction monitoring, the archaeologist may adjust the frequency, from continuous to intermittent, of the monitoring based on the conditions and professional judgment regarding the potential to impact resources. Mitigation Measure 3.F-1b: *Accidental Discovery of Archaeological Artifacts, Tribal Cultural Resources, or Burial Remains*. If historical or unique archaeological artifacts (including potential tribal resources) are accidentally discovered during construction, the District shall restrict work in affected areas until proper protocols are met. Work at the location of the find will halt immediately within 30 feet of the find. A "no work" zone shall be established utilizing appropriate flagging to delineate the boundary of this zone. A Consulting Archaeologist will visit the discovery site as soon as practicable for identification and evaluation pursuant to Section 21083.2 of the Public Resources Code and Section 15126.4 of the California Code of Regulations. If the archaeologist determines that the artifact is not significant, construction may resume. If the archaeologist determines that the artifact is significant, the archaeologist will determine if the artifact can be avoided and, if so, will detail avoidance procedures. If the artifact cannot be avoided, the archaeologist will develop within 48 hours an Action Plan which will include provisions to minimize impacts and, if required, a Data Recovery Plan for recovery of artifacts in accordance with Public Resources Code Section 21083.2 and Section 15126.4 of the CEQA Guidelines. Impacts to tribal cultural resources shall be assessed in consultation with culturally-affiliated Native American tribes. • If burial finds are accidentally discovered during construction, work in affected areas will be restricted or stopped until proper protocols are met. Upon discovering any burial site as evidenced by human skeletal remains, the County Coroner will be immediately notified and the field crew supervisor shall take immediate steps to secure and protect such remains from vandalism during periods when work crews are absent. No further excavation or disturbance within 30 feet of the site or any nearby area reasonably suspected to overlie adjacent remains may be made except as authorized by the County Coroner, California Native American Heritage Commission, and/or the County Coordinator of Indian Affairs.

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Cultural Resources and Tribal Cultural Resources (cont.)		
Impact 5.F: Cumulative increase in impacts on archaeological, paleontological, historical resources, and tribal cultural resources.	LSM	Mitigation Measure 3.F-1a: *Preconstruction Training and Cultural Resource Monitoring.* Mitigation Measure 3.F-1b: *Accidental Discovery of Archaeological Artifacts or Burial Remains.*
Energy		
Impact 3.G-1: The Project would result in wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation.	LSM	Mitigation Measure 3.C-1b: *BAAQMD Basic Construction Mitigation Measures* (see Section 3.C, Air Quality, Impact 3.C-2).
Impact 5.G: Cumulative environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources.	LSM	Mitigation Measure 3.C-1b: *BAAQMD Basic Construction Mitigation Measures* (see Section 3.C, Air Quality, Impact 3.C-2).
Geology and Soils		
Impact 3.H-1: The Project would not directly or indirectly cause potential substantial adverse effects involving strong seismic ground shaking.	LS	No mitigation required.
Impact 3.H-2: The Project would not result in substantial soil erosion or loss of the topsoil.	LS	No mitigation required.
Impact 3.H-3: The Project is located on a geologic unit or soil that could become unstable, but would not cause landsliding, lateral spreading, subsidence, liquefaction, or collapse.	LS	No mitigation required.
Impact 3.H-4: The Project would not expose people or structures to substantial direct or indirect risks to life or property related to expansive or corrosive soils, as defined by the Uniform Building Code.	LS	No mitigation required.
Impact 3.H-5: The Project would not directly or indirectly destroy a unique paleontological resource or site or unique geological feature.	LS	No mitigation required.

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Geology and Soils (cont.)		
Impact 5.H: Cumulative exposure of people or structures to geologic and seismic hazards.	LS	No mitigation required.
Greenhouse Gas Emissions		
Impact 3.I-1: The Project would not generate GHG emissions that would be above the District's threshold of significance for GHG emissions.	LS	No mitigation required.
Impact 3.I-2: The Project would not conflict with applicable plans, policies, and regulations adopted for the purposes of reducing GHG emissions.	LS	No mitigation required.
Impact 5.I: Cumulative effects related to greenhouse gas emissions.	LS	No mitigation required.
Hazards and Hazardous Materials		
Impact 3.J-1: The Project would not create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of hazardous materials during the use of equipment.	LS	No mitigation required.
Impact 3.J-2: The Project would not create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of contaminated soil.	LS	No mitigation required.
Impact 3.J-3: The Project would not create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of pesticides during operations.	LS	No mitigation required.

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Hazards and Hazardous Materials (cont.)		
Impact 3.J-4: The Project is located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 or other listings, but would not create a significant hazard to the public or the environment.	LS	No mitigation required.
Impact 3.J-5: The Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LS	No mitigation required.
Impact 5.J: Cumulative effects related to hazardous conditions and exposure to or release of hazardous materials.	LS	No mitigation required.
Hydrology and Water Quality		
Impact 3.K-1: The Project would violate water quality standards or waste discharge requirements, conflict with or obstruct implementation of the Basin Plan, or otherwise substantially degrade surface or groundwater quality.	LSM	Mitigation Measure 3.K-1: *Monitor and Manage the Quality of Lake Discharges to Creek*. The District and/or its contractor(s) shall monitor the quality of water discharged during drawdown of Almaden Lake during Project construction. Initially, water quality shall be tested for turbidity daily during discharge, or as required under the RWQCB Section 401 Water Quality Certification and/or Waste Discharge Permit obtained for the Project. When the lake reaches 10% of its capacity volume, the District shall monitor water quality at least hourly until direct discharge to Alamitos Creek ceases. Monitoring shall be completed in the field using portable equipment. If turbidity concentrations in excess of 500 NTU are detected or as indicated in the Permit, waters shall be treated by filtration (filter or media filtration), settlement, or other non-chemical means to remove sediment prior to discharge. Removed sediment shall be tested for mercury concentration, and disposed of in accordance with applicable requirements / regulations. If a dewatering permit from the RWQCB is required, water quality monitoring requirements identified here may overlap with permit requirements. In such a case, monitoring requirements under this mitigation measure could be reduced only to avoid duplicative sampling and analysis.
Impact 3.K-2: The Project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin or conflict with the Groundwater Management Plan.	LS	No mitigation required.

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Hydrology and Water Quality (cont.)		
Impact 3.K-3: The Project would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which could: (i) Result in substantial erosion or siltation offsite (ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite (iii) Create or contribute runoff water which would exceed the capacity of existing planned stormwater drainage systems or provide substantial additional sources of polluted runoff (iv) Impede or redirect flood flows	LSM	Mitigation Measure 3.K-3: *Final Siting of Sheet Pile System*. Prior to the initiation of construction, the District and/or its contractors shall determine the final siting of the temporary sheet pile system based on a hydrologic assessment during design. The design shall site all proposed sheet piles needed for Project construction to ensure that sufficient capacity would be available in the temporary creek system to convey up to a 100-year storm event (i.e., approximately 8,250 cfs).
Impact 5.K: Cumulative impacts related to the degradation of surface or groundwater quality, conflict with the Basin Plan, depletion of groundwater resources, alteration of drainage patterns or addition of impervious surfaces in a manner which would cause erosion or siltation, substantially increase runoff, cause flooding, exceed stormwater systems, or impede or redirect flood flows.	LSM	Mitigation Measure 3.K-1: *Monitor and Manage the Quality of Lake Discharges to Creek*. ~~No mitigation required.~~
Noise		
Impact 3.L-1: The Project would generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	LSM	Mitigation Measure 3.L-1~~a~~: *Construction Noise Logistics Plan*. The District and/or its contractors shall develop and adhere to a Construction Noise Logistics Plan, in accordance with General Plan Policy EC-1.7. The Plan will specify hours of construction, noise and vibration minimization measures (e.g., use of exhaust mufflers, use of and hydraulically or electrically powered equipment, and use of noise shields, blankets, and/or enclosures), provide for / require posting and notification of residences within 500 feet of the construction site of construction schedules, and designate a noise disturbance coordinator to respond to neighborhood complaints during construction. The noise disturbance coordinator shall ensure that the Plan is implemented, and shall be available to respond to complaints during all construction work hours. All construction activities conducted within 500 feet of a residence shall be completed between the hours of 7:00 a.m. and 7:00 p.m., on weekdays; or Saturdays if permitted by the City. The Plan shall include a provision

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Noise (cont.)		
Impact 3.L-1 (cont.)		restricting all Project-related construction traffic to the site via the Guadalupe River Trail north of Almaden Lake Village to worker vehicles only (i.e., no haul truck access) and a provision restricting hourly truck trips along Winfield Boulevard, south of Coleman Road, to no more than 70 trips per hour. ~~*Mitigation Measure 3.L-1b: Install a Fully Enclosed Pump Station*. The District and/or its construction contractors shall be required to fully enclose the pumps at the proposed pump station, to reduce operational noise levels. The enclosure shall fully cover all pumps, and shall be sufficient to reduce noise levels to 55 dB or lower at each residence within 500 feet of the Project site.~~
Impact 3.L-2: Project-related construction would not generate excessive vibration and groundborne noise exposure in the Project vicinity.	LS	No mitigation required.
Impact 5.L: Cumulative increases in noise and vibration in the Project area.	LSM	Mitigation Measure 3.L-1~~a~~: *Construction Noise Logistics Plan.* ~~Mitigation Measure 3.L-1b: *Install a Fully Enclosed Pump Station.*~~
Public Services		
Impact 3.M-1: Development of the proposed Project could result in an increase in calls for fire protection, police services and emergency medical response services, but would not require new or physically altered fire or police facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable performance objectives.	LS	No mitigation required.
Impact 3.M-2: Development of the proposed Project could result in an increase in the use of existing neighborhood and regional parks and recreation centers, but not to the extent that substantial physical deterioration of the facilities would occur or be accelerated, nor would it cause the necessity for new or expanded facilities.	LS	No mitigation required.
Impact 5.M: Cumulative effects on public services.	LS	No mitigation required.

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Recreation		
Impact 3.N-1: The Project would not result in the loss of recreational opportunities that would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS	No mitigation required.
Impact 3.N-2: The Project would not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment	LS	No mitigation required.
Impact 5.N: Cumulative effects on recreational resources during construction.	LS	No mitigation required.
Transportation		
Impact 3.O-1: The Project would increase traffic volumes on area roadways, but would not conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.	LS	No mitigation required.
Impact 3.O-2: The Project would not conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)	LS	No mitigation required.
Impact 3.O-3: The Project would not substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	LS	No mitigation required.
Impact 3.O-4: The Project would not result in inadequate emergency access.	LS	No mitigation required.
Impact 5.O: Cumulative traffic increases on local and regional roads.	LS	No mitigation required.

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TABLE S-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance Determination	Mitigation Measure
Utilities and Service Systems		
Impact 3.P-1: The Project would not require or result in the relocation or construction of new or expanded water treatment or storm water drainage, electrical power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects; the Project would not have insufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years.	LS	No mitigation required.
Impact 3.P-2: The Project would not generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.	LS	No mitigation required.
Impact 3.P-3: The Project would not be out of compliance with federal, state, and local management and reduction statutes and regulations related to solid waste.	LS	No mitigation required.
Impact 5.P: Cumulative impacts related to disruption of utility service or relocation of utilities.	LS	No mitigation required.

LS = less than significant; LSM = Less than Significant with Mitigation; SU = significant and unavoidable.

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CHAPTER 1
Introduction

The Santa Clara Valley Water District (District) is proposing the Almaden Lake Improvement Project (Project) at Almaden Lake Park (Park) in the City of San José (City). The Project would separate Alamitos Creek from Almaden Lake (lake) within the footprint of the lake, to reduce water temperatures downstream of the lake, improve physical habitat for native fish and passage for anadromous fish and reduce fish predation, while improving water quality and minimizing impacts to existing recreational features in the Park. The proposed improvements would include modification of the existing contour of Almaden Lake, with restoration of a creek channel within the existing lake area. Other measures would protect the existing lake area to support habitat and recreational beneficial uses, while promoting water quality improvement objectives laid out by the San Francisco Bay Regional Water Quality Control Board (RWQCB) in its 2008 Basin Plan Amendment.

Developed as a partnership between the City and the District in the late 1970s, Almaden Lake Park is a 65-acre recreational facility that includes the 32-acre Almaden Lake, and offers to the public miles of hiking trails, biking, picnic areas, volleyball, bocce ball courts, pedal boating, and other recreational activities. However, due to historic mining activities upstream of Almaden Lake and the lake's deep bathymetry, mercury-laden sediment has accumulated at the bottom of the lake. Driven by anoxic conditions at the lake bottom, microbial methylation of mercury has resulted in high levels of methylmercury in water and fish. The lake is also subject to other notable water quality issues, including high temperature, high bacteriological counts, potentially toxic algae blooms, and low dissolved oxygen. By implementing the proposed changes, the District aims to reduce methylmercury generation and improve overall water quality. In this way, the Project would promote the ability of the District to improve conditions in the lake for fish, while minimizing impacts on existing recreational features.

On November 6, 2012, voters approved the Safe, Clean Water and Natural Flood Protection Program as a countywide special parcel tax. On November 4th, 2020, voters approved to extend this tax indefinitely. ~~for 15 years with a sunset date of June 30, 2028.~~ The Safe, Clean Water and Natural Flood Protection Program addresses the needs, values, and priorities identified by Santa Clara County stakeholders, which includes funding Priority D to Restore Wildlife Habitat and Provide Open Space. Under this Priority is Project D4 – Fish Habitat and Passage Improvement, which includes two Key Performance Indicators (KPIs) related to creek/lake separation. KPI #1 requires that the District complete planning and design for two creek/lake separation projects, while KPI #2 requires that the District construct one creek/lake separation project in partnership with local agencies. The District Board of Directors has not yet determined which creek/lake separation project will be constructed to meet the KPIs for the

Priority 4D project. The requirements of the Safe, Clean Water and Natural Flood Protection Program relevant to this Project are further described in Section 2.D.1, Project Components. The Almaden Lake Improvement Project, as proposed, is intended to help restore and maintain healthy steelhead trout populations by improving fish passage and habitat.

In addition, the Almaden Lake Improvement Project, as proposed, would also serve as offsite mitigation for another District project, specifically the Upper Berryessa Flood Risk Management Project (Upper Berryessa Project) which the District approved in February 2016. In April 2017, the San Francisco Bay Regional Water Quality Control Board (Regional Board) adopted Order No. R2-2017-0015 (Order) issuing waste discharge requirements and water quality certification to the District and the U.S. Army Corps of Engineers for construction and operation of the Upper Berryessa Project. The Order requires that the District propose and construct an offsite mitigation project to enhance 15,000 linear feet or 15 acres of creek waters or the equivalent for the Upper Berryessa Project's impacts on jurisdictional waters. In August 2018, the Regional Board staff issued a technical memorandum[1] concluding that the Almaden Lake Project would provide adequate enhancement to water quality and beneficial uses in jurisdictional waters to more than compensate for impacts from both the Almaden Lake Project and the Upper Berryessa Project.

1.A Purpose of the EIR

The District is the lead agency responsible for California Environmental Quality Act (CEQA) environmental review of projects undertaken or sponsored by the District. CEQA requires the preparation of an Environmental Impact Report (EIR) when a project could significantly affect the physical environment. The District determined that the Project could potentially cause significant environmental impacts, and that preparation of an EIR was therefore required for the Project to comply with CEQA.

The District has prepared this EIR to provide the District's Board of Directors (Board), the public, and responsible and trustee agencies reviewing this Project, with information about the potential physical effects, both beneficial and adverse, on the local and regional environment associated with implementation of the Project. This EIR was prepared in compliance with CEQA (California Public Resources Code, Sections 21000 et seq.), and the CEQA Guidelines (Code of Regulations Title 14, Chapter 3, Sections 15000 et seq.).

This EIR describes the Project under consideration by the District. The document characterizes the Project setting, discloses the range of potential environmental impacts of the Project, and identifies mitigation measures where those impacts would be significant. The EIR also addresses cumulative adverse impacts to which the proposed Project could make a substantial contribution. Also, as required under CEQA, it describes and evaluates potentially feasible alternatives to the Project that could avoid or reduce significant impacts while still meeting most of the Project's objectives.

[1] Memo from SFRWQCB to SCVWD, August 8, 2018, Proposed Use of Almaden Lake Project to Comply with the Order for the Upper Berryessa Creek Flood Risk Management Project.

1.B EIR Process

1.B.1 Notice of Preparation and Scoping

In accordance with Section 15082 of the CEQA Guidelines, the District, as the CEQA lead agency, prepared a Notice of Preparation (NOP) for this EIR. The NOP contained a description of the Project, a discussion of possible alternatives, a map of the Project area, and a summary of the probable environmental effects of the Project to be addressed in the EIR, and is included in this EIR as Appendix A. On March 27, 2014, the NOP was mailed to interested parties, including individuals; local, state, federal agencies, and posted by the County Clerk. The 30-day scoping period for the Project remained open through April 26, 2014. On April 9, 2014, the District held a Project scoping and update meeting at Castillero Middle School. An invitation to the meeting was mailed to approximately 3,000 area residents, and was posted on the District website, with an announcement posted on the District's blog. The NOP was also sent, via certified mail, to all applicable resource agencies required under CEQA.

The District received four comment letters from local organizations, and state and federal agencies during the comment period, as well as 30 questions from attendees during the public meeting on April 9, 2014. The NOP, comment letters, and questions (with District responses) from the public meeting are included in Appendix A.

1.B.2 Draft EIR

The~~is~~ Draft EIR (DEIR) was made ~~is~~ available to local, state, and federal agencies, and to interested organizations and individuals, who may want to review and comment on the analysis provided, for a 45-day period from December 13, 2019 through January 27, 2020. An additional 8 days was provided to respond to agency and organization requests for additional review time ~~identified on the notice that is inside the front cover of the document~~. Notice of this DEIR ~~has~~ was also sent directly to every agency, person, or organization that commented on the NOP. During the public comment period, written comments on the adequacy of the DEIR ~~may~~ were ~~be~~ submitted to:

Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San José, CA 95118

Comments ~~may~~ were also accepted ~~also be submitted~~ electronically via email to Michael Martin at MichaelMartin@valleywater.org. During this 45-day review period, copies of the DEIR ~~will~~ were made ~~be~~ available for public review at the following locations:

- Santa Clara Valley Water District Office, located at 5750 Almaden Expressway, San José
- Public libraries
  - Almaden Branch Library, 6445 Camden Avenue, San José
  - Vineland Branch Library, 1450 Blossom Hill Road, San José

- Pearl Avenue Branch Library, 4270 Pearl Avenue, San José
- Edenvale Branch Library, 101 Branham Lane East, San José
- Cambrian Branch Library, 1780 Hillsdale Avenue, San José
- Santa Teresa Branch Library, 290 International Circle, San José

An electronic copy of the DEIR ~~can also be viewed and downloaded~~ was available for review and download at https://www.valleywater.org/project-updates/public-review-documents. The District ~~will also~~ conducted a public hearing to receive oral comments on the adequacy of the analysis included in the DEIR. The meeting ~~will~~ was ~~be~~ held on:

Date: Wednesday, January 8, 2020
Time: 6:00 p.m.
Location: Santa Clara Valley Water District Headquarters, Board Room
5700 Almaden Expressway
San José, CA 95118

1.B.3 Final EIR

All written comments received on the adequacy of this DEIR during the public review period ~~will~~ are ~~be~~ addressed in the ~~a~~ "response-to-comments" document (Appendix G) which, together with ~~this~~ the DEIR, ~~will~~ constitute the Final EIR (FEIR). The response-to-comments document ~~will~~ also presents any changes to the DEIR resulting from public and agency input and District staff initiated changes. These changes are shown in underline and strikeout format in this FEIR text, together with other staff initiated revisions to the DEIR text. None of the comments, responses, or DEIR revisions constitute "significant new information" that would require DEIR recirculation under CEQA Guidelines Section 15088.5.

Chapter 2, Project Description has been updated to include a new water source pipeline alignment, which was added to the Project to reduce potential effects on riparian vegetation and habitat. In addition, a staging area that is not required was removed from the Project, and other minor modifications of the Project description have been identified.

Prior to any decision to approve, revise, or reject the Project, the Board will review the FEIR and consider certifying the document at a regularly-scheduled board meeting. Upon EIR certification, the District may proceed with Project approval actions. Approval of the Project would include written findings for each significant adverse environmental effect identified in the EIR (CEQA Guidelines § 15091). At the time that CEQA findings are adopted, the District would also adopt a mitigation monitoring and reporting program (MMRP) for adopted mitigation measures (further discussed below).

1.B.4 Mitigation, Monitoring, and Reporting

Although CEQA Guidelines do not require that the specific reporting or monitoring program be included in the EIR, California law requires lead agencies to adopt a MMRP for those mitigation measures that are conditions of project approval and that are necessary to reduce or avoid significant effects on the environment. All adopted measures will be included in an

MMRP to ensure CEQA compliance during project implementation (CEQA Guidelines § 15097(a)).

1.C Organization of the ~~Draft~~ EIR

Prior to this chapter, this ~~D~~EIR contains a summary section, which provides a concise overview of the document. The Executive Summary allows the reader to review a summary of the analysis of potentially significant effects, proposed mitigation measures, residual environmental impacts after mitigation, and alternatives to the Project that reduce or avoid effects on the environment. The Executive Summary culminates with the Summary of Environmental Impacts and Mitigation Measures. This table lists each identified environmental impact, associated mitigation measures, and the level of significance following mitigation. Those individuals who wish to read them in greater detail are directed to the main body of the document.

Following this chapter, this ~~D~~EIR has been organized as follows:

Chapter 2, Project Description. This chapter provides a detailed description of the Project, including a description of the Project vicinity, existing facilities, construction information, and anticipated maintenance requirements. It includes a discussion of the existing facilities and operations, project needs, and project objectives as well as a brief overview of the District's process to consider whether to approve the Project.

Chapter 3, Environmental Setting, Impacts, and Mitigation Measures. Each environmental topic is discussed in a separate section within this chapter. Each section contains a discussion of the setting (existing environmental and regulatory setting), and the environmental impacts that could result from the Project; this analysis includes specific District BMPs incorporated in the Project that would serve to avoid or reduce impacts. Each section also presents feasible mitigation measures for significant adverse impacts. The criteria used to assess the significance of adverse environmental effects are identified, and the significance of the impact both prior to and following mitigation is reported.

Chapter 4, Alternatives. This chapter evaluates a range of alternatives to the Project, including the No Project Alternative, which is required by CEQA. <u>It also describes why other alternatives that were considered but not selected for detailed evaluation.</u>

Chapter 5, Cumulative Impacts. This chapter describes the impacts of the Project in combination with impacts of past projects, current, and reasonably foreseeable probable future projects that could potentially result in impacts similar to those resulting from construction and/or operation of the Project.

Chapter 6, Other CEQA Issues. This chapter describes the Project's growth-inducement potential, and summarizes the significant and unavoidable effects of the Project and the significant and irreversible environmental changes of the Project.

Chapter 7, ~~Draft~~ EIR Preparers. This chapter lists persons, and affiliations of those persons who prepared this EIR.

1.D References

San Francisco Bay Regional Water Quality Control Board (RWQCB), 2008. Resolution R2-2008-0089. Amending the Water Quality Control Plan for the San Francisco Bay Region to Establish New Water Quality Objectives, Total Maximum Daily Loads, and an Implementation Plan for Mercury in the Guadalupe River Watershed. Adopted October 14, 2008. Available: http://www.waterboards.ca.gov/rwqcb2/board_decisions/adopted_orders/2008/R2-2008-0089.pdf.

CHAPTER 2
Project Description

This chapter presents an overview of the Project; its needs and objectives; and construction and maintenance information and methods.

2.A Introduction

The Almaden Lake Improvement Project (Project) is in the City of San José's (City) Almaden Lake Park (Park). As discussed in detail in Section 2.C, Existing Facilities and Operations, Needs and Objectives, the 32-acre Almaden Lake (located entirely within Almaden Lake Park) formed when a quarry levee breached. The loss of the integrity of the Alamitos Creek channel and commingling of creek water with lake water has created adverse conditions for the anadromous fish population. Further, mercury-laden sediment from historic upstream mining activities continues to be transported downstream in Alamitos Creek and is deposited in Almaden Lake. Seasonal lake conditions contribute to the conversion of elemental mercury to methylmercury as well as other negative water quality conditions. The Project would address these issues by reestablishing the Alamitos Creek channel, separating the creek from Almaden Lake (lake) in order to improve anadromous fish access to spawning and rearing habitat within the upper portions of the Guadalupe River Watershed, and reducing methylmercury levels in the lake. Specifically, the Project would include the following improvements:

- Separating Alamitos Creek from Almaden Lake by constructing a levee and restoring the channel;
- Re-contouring the remaining lake bottom and capping it with clean fill;
- Expanding the Park area into a small portion of the existing lake at the beach area;
- Stabilizing the existing island and constructing a new additional island;
- Establishing appropriate native vegetation along the banks and floodplain of the restored Alamitos Creek channel, new lake edge, and the islands;
- Connecting the lake via pipeline to an imported water supply from the nearby Almaden Valley Pipeline;
- Adding a pipeline connection between the lake and the Alamitos Percolation Pond/Los Capitancillos Percolation Ponds ~~(Ponds)~~, which are ~~is a~~ groundwater recharge ponds operated by the Santa Clara Valley Water District (District); and

- Continuing to implement measures to manage and reduce future methylmercury production, such as solar-powered circulators.

2.B Project Location

Almaden Lake Park is a 65-acre, public access park located in Santa Clara County, within the southern portion of the City of San José (Figure 2-1). Almaden Lake and Alamitos Creek are within the Guadalupe River Watershed and are tributaries of the Guadalupe River, which begins at the confluence of Guadalupe Creek and Alamitos Creek.

Almaden Lake Park is bounded by Coleman Road to the north, Almaden Expressway to the west, Winfield Boulevard to the east, and a pedestrian bridge that spans Alamitos Creek, Los Alamitos Creek Trail and commercial parcels to the south. The area surrounding Almaden Lake Park includes moderate-density residential uses (Cal Engineering & Geology, 2015).

The Project area includes the entirety of Almaden Lake and proposed pipeline corridors connecting Almaden Lake to the Almaden Valley Pipeline (upstream) and ~~Los~~ Alamitos Percolation Pond and Los Capitancillos Percolation Ponds (downstream). The Project includes temporary construction staging areas at the southwestern portion of Almaden Lake Park~~, the currently vacant property owned by the City of San José also known as the Sycamore Terrace property (located at the northeast corner of Almaden Expressway and Coleman Road),~~ and the District's Winfield Warehouse (located on Winfield Boulevard north of Coleman Road).

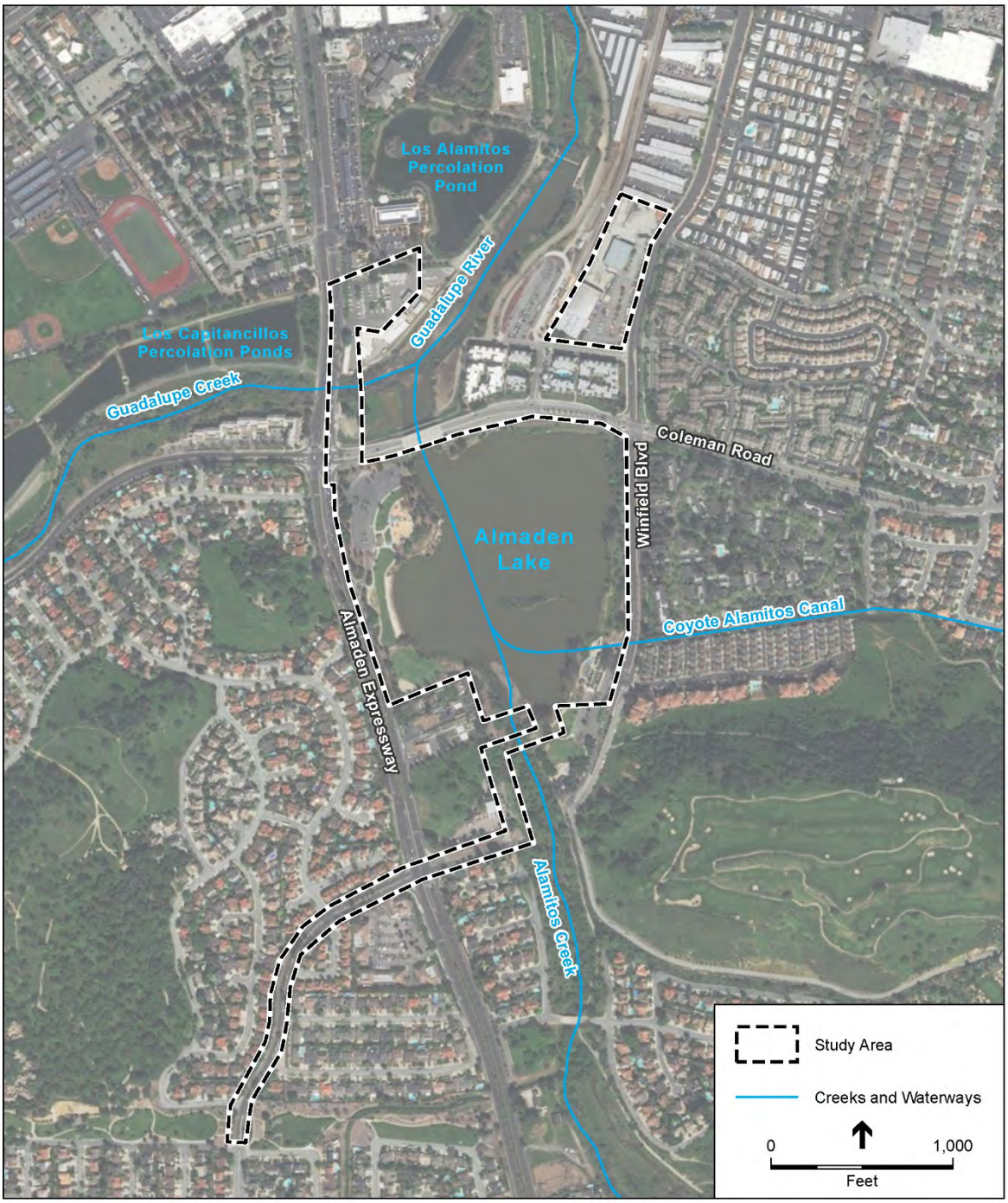
2.C Existing Facilities and Operations, Needs and Objectives

2.C.1 Existing Facilities and Operations

Almaden Lake

Almaden Lake was created by in- and off-stream gravel quarry operations, circa late 1940's to 1960. The off-stream quarry operation was located along the east side of Alamitos Creek and was comprised of two main large pits. After the gravel quarry operations ceased, heavy storm events eroded the levee that separated the creek from the quarry, resulting in discharge of creek waters into the former quarry area, creating Almaden Lake. The lake's bottom is unnaturally varied, and in places deep due to the remnant pits.[1] Remnant dikes that separated individual pits during quarry operations remain, but are now submerged below the water surface. The existing water level of the lake is at an elevation of approximately 188 to 190 feet above mean sea level (msl).

[1] Almaden Lake depths range between 2 feet and up to 47 feet (SCVWD, 2013).



SOURCE: USDA, 2016; Santa Clara Valley Water District

Almaden Lake Improvement Project . 130679

Figure 2-1 (Revised)
Project Site

Almaden Lake Park

Almaden Lake Park was developed as a partnership between the City and the District in the late 1970s. District and City responsibilities at Almaden Lake Park are dictated by a joint use agreement. The District is responsible for flood protection, water resource management, and stream stewardship of the lake. The City is responsible for managing recreational uses of the Park, including swimming, fishing, non-motorized boating, picnicking, non-motorized bicycling, and hiking activities. Due to water quality concerns, the City has closed Almaden Lake to swimming since August 2010. The City is also responsible for certain operations and maintenance activities such as graffiti abatement, patrolling, and repairing damage to District facilities resulting from public use.

Almaden Valley Pipeline

The Almaden Valley Pipeline water is a raw (untreated) water pipeline operated by the District. In addition to imported water, the Almaden Valley Pipeline can convey water captured at Anderson Reservoir and Calero Reservoir for water supply uses.

~~Los~~ Alamitos Percolation Pond and Los Capitancillos Percolation Ponds

The ~~Los~~ Alamitos Percolation Pond is located approximately 1,000 feet north of Almaden Lake, west of the Guadalupe River. The ~~Los~~ Alamitos Percolation Pond is a groundwater recharge Pond that would take water from Almaden Lake to enhance circulation is the lake after implementation of the Project. Currently, water from Guadalupe River is diverted to ~~Los~~ Alamitos Percolation Pond for recharge of the groundwater basin, or water can also be delivered from a 24-inch diameter pipeline under Almaden ~~Parkway~~ Expressway from the Los Capitancillos Percolation Ponds (located west of Almaden Expressway). Similar to the ~~Los~~ Alamitos Percolation Pond, the Los Capitancillos Percolation Ponds are groundwater recharge ponds owned and operated by the District. These sources would continue to be utilized after implementation of the Project.

Water Rights

Under existing operations, the ~~Los~~ Alamitos Percolation Pond can be filled when the Alamitos Flashboard Dam[2] is installed at the Alamitos Drop Structure. The ~~Los~~ Alamitos Percolation Pond and Guadalupe Percolation Ponds (which are fed by the ~~Los~~ Alamitos Percolation Pond) have a model recharge capacity of 22 acre feet per day, or about 8,000 acre feet per year (AFY). The water diverted to the percolation ponds can come from various water rights owned by the District (3,302 AFY from the Guadalupe River; 2,500 AFY from Almaden Reservoir; 6,000 AFY from the Almaden-Calero Canal; 3,500 AFY from Calero Reservoir; and 3,500 AFY from Guadalupe Reservoir), or from imported water that

[2] While not part of the Project, the seasonal Alamitos Flashboard Dam is located downstream of Almaden Lake and is part of the Guadalupe Water Supply Management System, which develops local water supplies from the District's water rights. The flashboard dam is typically installed in April and removed in December to allow flow conveyance during winter storm events. No changes to flashboard operation would occur under the proposed Project.

can be released at Calero Reservoir, Alamitos Creek, or Guadalupe Creek to flow downstream to the Alamitos Flashboard Dam.

Almaden Lake Vegetation Management

Maintenance requirements for the existing vegetation along the lake's banks are minimal, except for some vegetation management activities on the island such as hand weeding and herbicide application on invasive vegetation. In September 2009, the District began a four-year project to remove giant reed (*Arundo donax*) from the island. This non-native plant had previously covered nearly 100 percent of the island. Following removal, the island was planted with native riparian trees to create habitat for several species of roosting birds that populate the island. Although the riparian vegetation is now self-sufficient, the island's banks are unstable and prone to erosion, and retreatment of giant reed is needed periodically.

2.C.2 Project Needs

Mercury in Almaden Lake

The New Almaden Quicksilver Mine is in the upper Guadalupe River Watershed and operated from 1850 to 1970. The New Almaden Quicksilver Mine contributed to the release of approximately 6,500 tons of mercury into local creeks and rivers during its years of operation (SCVWD, 2015a).

Since the formation of Almaden Lake, mercury-laden sediment originating from the mine has been depositing into the lake. This has resulted in the accumulation of mercury-laden sediments on the lake bottom, as upstream sediments settle out of the water column in the lake typically during high flow events. Bottom waters and sediments in the lake frequently experience low oxygen or anoxic conditions due to the lake's depth and seasonal algal blooms caused by high nutrient and organic matter loadings. Under such conditions, certain microbes readily transform elemental mercury into methylmercury, a strong neurotoxin that accumulates in the tissues of organisms, which has bioaccumulated in Almaden Lake's fish (SCVWD, 2015a).

In October 2008, the RWQCB adopted a Total Maximum Daily Load (TMDL) for mercury in the Guadalupe River watershed, including Almaden Lake, as well as site-specific objectives for mercury in fish tissue (RWQCB, 2008). Prior to the TMDL adoption, the District voluntarily initiated control measures to reduce the methylmercury concentrations in the lake by installing four solar-powered circulators (SolarBees) between 2006 and 2009, which were intended to help alleviate conditions that favor the formation of methylmercury by mixing lake waters, thereby increasing dissolved oxygen in the water column and reducing anoxic conditions. The District continues to operate these SolarBees. Water quality testing results from 2009 to 2017 have shown a reduction in methylmercury concentrations in the lake; however, reductions in methylmercury in fish tissue have not been conclusively observed (SCVWD, 2017b).

The proposed Project is being undertaken to address methylmercury production in the lake and reduce direct input of mercury into the lake, which would promote the water quality objectives laid out by the San Francisco Bay Regional Water Quality Control Board (RWQCB) in the 2008 Basin Plan Amendment (RWQCB, 2008).

Fisheries and Barriers to Anadromous Fish Passage

The Guadalupe Watershed provides habitat for the federally-threatened Central California Coast Steelhead[3] and other anadromous fish (see Section 3.E, Fisheries Resources). Up-migrating adult steelhead must pass through Almaden Lake to reach Alamitos Creek's upstream spawning and rearing habitat. Similarly, juvenile steelhead smolts must pass through the lake when they out-migrate downstream to the ocean (SCVWD, 2015a).

The comingling of Almaden Lake with Alamitos Creek imposes entrainment and predation impacts to steelhead by disrupting its migratory passage through the footprint of the lake. These effects result in non-physical barriers to passage, including conditions that can imperil native fish and degrade aquatic habitat downstream. For example, entrainment in the lake is possible, making it difficult for steelhead and other anadromous fish to find the source stream (i.e., Alamitos Creek/Calero Creeks) at the upstream end of the lake (SCVWD, 2013). When native fish become entrained, they are vulnerable to predation from non-native fish species, thus reducing the success of the species. Due to the unnaturally varied depths within the lake, and the lake's large surface area and long residence time, surface temperatures of the lake are elevated compared to the upstream Alamitos Creek source water. Elevated temperatures create conditions that are not optimal for steelhead and other anadromous fish. These temperature issues extend downstream of the lake into the Guadalupe River, as water released from the lake travels downriver.

Other Water Quality Concerns

In addition to the issues of methylmercury described above, Almaden Lake also carries high concentrations of coliform bacteria and is subject to seasonal blue-green algae blooms. These issues result from the release of fecal matter from waterbirds, combined with lack of water circulation during low flow periods, warm temperatures, and nutrient loading, which together support algae blooms and continued presence of elevated bacteria levels. As a result of poor water quality and City of San José operational constraints (SCVWD, 2013), public use of the lake has been impeded, and Almaden Lake has been closed to swimming since August 2010. Additionally, poor quality water released from the lake contributes to degraded water quality downstream of the lake in the Guadalupe River.

2.C.3 Project Objectives

The Project purpose is to restore Alamitos Creek's function within the footprint of Almaden Lake Park in order to improve physical habitat for steelhead and other anadromous fish,

[3] The National Marine Fisheries Service (NMFS) has been refining the listing and habitat status of Central California Coast Steelhead since 1997 (Federal Register. 61:41541-4156).

while improving water quality within the lake footprint, and minimizing impacts to existing recreational features within the Park.

This purpose would be accomplished through the following objectives:

- Separate Alamitos Creek from Almaden Lake.
- Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives.[4]
- Remove potential lake entrainment of anadromous fish.
- Improve temperature conditions and reduce predation for native fish.
- Minimize impacts to existing recreational features.

Separating Alamitos Creek from Almaden Lake would restore Alamitos Creek's upstream and downstream connectivity within the Guadalupe River Watershed, restoring habitat linkages for native fish and anadromous fish species, and would create a geomorphically stable creek channel that would improve sediment transport and restore natural creek functions. Therefore, the Project would help to restore and maintain healthy fish populations by improving fish habitat and passage in the creek channel.

Leveling the irregular lake bottom and capping existing elemental mercury in the lake bed would assist in addressing Almaden Lake's mercury-related water quality issues. Re-contouring the lake bottom, continuing effective control measures (e.g., operation of SolarBee solar powered circulators) to manage future methylmercury production and bioaccumulation in fish, and utilizing a water source that minimizes the reintroduction of mercury to the lake would promote the ability of the District to meet the water quality objectives laid out by the San Francisco Bay Regional Water Quality Control Board (RWQCB) in the 2008 Basin Plan Amendment (RWQCB, 2008).

2.D Project Description

As described in Section 2.A, Introduction, the proposed Project includes separating Alamitos Creek from the lake and restoring its upstream and downstream connectivity, re-contouring the lake bottom and capping it with clean fill, expanding the Park into the existing lake and beach areas, expanding the existing island and constructing a new island, establishing vegetation, and connecting the lake via pipeline to an imported water source. Table 2-1 below summarizes the Project components. Figure 2-2 illustrates the proposed Project

[4] Water quality objectives are discussed in Section 3K, Hydrology.

within the Almaden Lake area, which includes a ~~17~~ 15-acre lake surface area, and retains the portion of the Park associated with the existing boathouse. Figure 2-3 displays a cross section of the proposed lake and creek in the new park area shown in Figure 2-2a. Each Project component is described in greater detail in the following section.

TABLE 2-1
SUMMARY OF PROJECT COMPONENTS

Project Element	Description
Alamitos Creek Restoration	Separation of Alamitos Creek from the lake area
	Construction of a geomorphically stable, self-sustaining channel for Alamitos Creek
	~~11~~ 10 acres of restored creek area
	20-foot wide levee along top with maintenance road and public trail
	Construct ~~two~~ three maintenance access ramps into new creek area
Almaden Lake Separation	Separation of the lake area from Alamitos Creek
	~~17~~ 15 acres of lake water surface area
	Reshaping of remaining lake bed and capping of mercury-laden sediment with clean clay
	Relocation of the boat launch ramp and boat house
Open Park Area Expansion	Addition of approximately 2 acres of open park area at the existing west beach and lake area
Island Areas Expansion and New	Expansion of existing island to 0.75 acres and construction of new 0.75 acre island
Almaden Lake Source Water Connection	Supplying of source water to the lake to maintain a water level between 188 feet and 190 feet above msl (consistent with existing conditions). Water would be supplied from the Almaden Valley Pipeline, which would provide imported raw water for use in the lake
Almaden Lake Connection to ~~Los~~ Alamitos Percolation Pond or Los Capitancillos Percolation Ponds	Pumping Almaden Lake water via an outlet structure into a new pipeline connecting to ~~Los~~ Alamitos Percolation Pond or Los Capitancillos Percolation Ponds for circulation.
Vegetation Installation	Installation of riparian vegetation along both sides of the new levee, west bank of the restored creek, and the islands



SOURCE: Santa Clara Valley Water District

Almaden Lake Improvement Project . 130679

Figure 2-2a (Revised)

Conceptual Site Plan: Almaden Lake

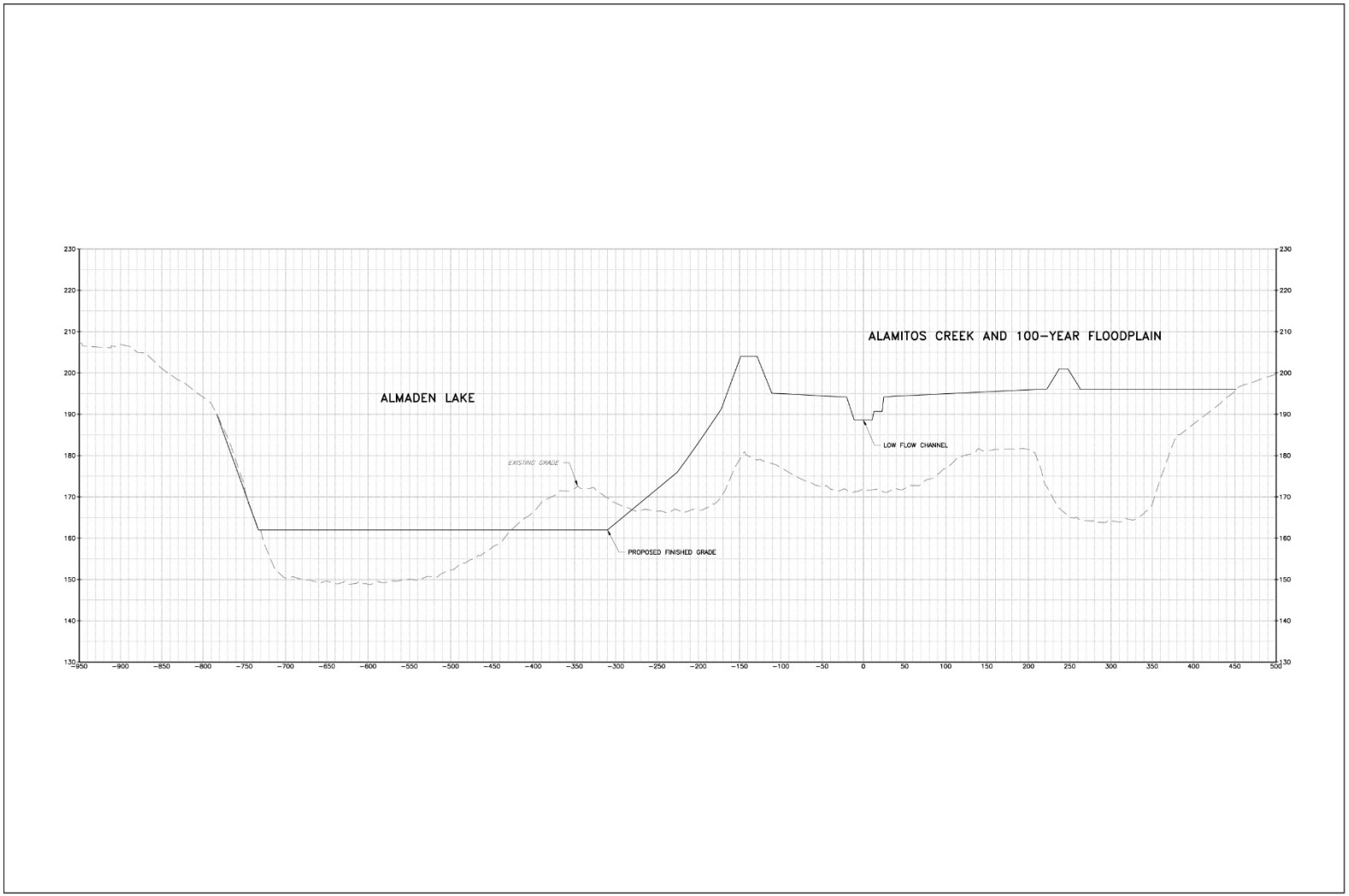


SOURCE: Santa Clara Valley Water District

Almaden Lake Improvement Project . 130679

Figure 2-2b (Revised)

Site Plan: Staging Areas and Site Access



SOURCE: Santa Clara Valley Water District

Almaden Lake Improvement Project . 130679

Figure 2-3 (Revised)
Project Cross Section

2.D.1 Project Components

Alamitos Creek/Almaden Lake Separation

Alamitos Creek Channel Restoration

The proposed Project would restore Alamitos Creek within the Project area, in an isolated, 1,800-foot long, leveed corridor. The restored creek section would feature a 25- to 45-foot wide low flow channel that would convey normal daily flows along the creek, bounded on either side by a 210- to 420-foot wide restored flood channel. The low flow channel would incorporate habitat features such as woody debris, boulders, or rootwads to create natural velocity breaks and dissipate flows.

The vegetated and restored flood channel would be designed to convey a 100-year flood event, equivalent to a flow rate of approximately 8,250 cubic feet per second (cfs), with a minimum of 2 feet of freeboard below the top of the proposed levee. The current (pre-project) creek and lake configuration also conveys a 100-year flood event. The intent of the new channel design is to maintain the same level of flood protection as the pre-project condition and avoid reintroduction of creek water and sediments to Almaden Lake.

The creek channel would be restored by developing and implementing a stable geomorphic channel design. The geomorphic design would include a riffle-pool-run pattern, designed to neither aggrade nor degrade, for the entire length of the restored creek section. The slope and riffle-pool-run pattern would be similar to the Alamitos Creek channel section immediately upstream of the Project area.

Stream bank protection may be required along:

- The existing Alamitos Creek west bank upstream of the future creek floodplain area,
- The new and existing Alamitos Creek east bank at the upstream tie-in area,
- The new Alamitos Creek eastern levee at the downstream tie-in area,
- The existing east and west embankments of Almaden Lake at the downstream tie-in area,
- Other limited areas within the creek channel embankments as needed (to be determined during design).

Bank protection measures would be determined during design and may consist of buried log toe protection or buried rock rip rap. Bank protection measures would be designed to prevent channel scour and erosion. A short wall, that would be built to an approximate elevation of 204 feet NAVD, would be installed at the upstream tie-in area, where the proposed trail would connect to the Los Alamitos Creek Trail to contain creek flow during high water events.

The proposed west and east embankments of the isolated Alamitos Creek channel would be graded to have similar slopes to the upstream and downstream connecting corridor sections –

that is, 2 horizontal to 1 vertical (2H:1V). A berm that would be built to an approximate elevation of 201 feet NAVD would separate ~~T~~the west embankment adjacent to the low bench planting area that would consist of upland woodland vegetation from the new park area. The berm would exhibit slopes of approximately 3H:1V on both sides. The berm would have an armored aggregate finish surface and would be utilized as a pedestrian pathway. The pedestrian pathway would be 10 feet wide and would add a connection to the existing Los Alamitos Creek Trail on the west side of the park and minor grade modification would be made to tie into the existing trail. The new park area behind the berm would exhibit a very gradual slope from a drain at the bottom of the berm up to the existing park ~~at is mostly flat and maintains an elevation of approximately 196 feet NAVD. The rest of the west embankment would conform to the natural bank at approximately 3H:1V slope.~~

The eastern levee between the lake and the isolated channel would be constructed with a width of 20-feet (SCVWD, 2015a) at an elevation of 204 feet NAVD. The soil beneath the new levee and western berm would be reinforced by incorporating cement deep soil mixing (CDSM), an in situ treatment whereby native soils or fills are blended with cementitious and/or other materials, referred to as binders. The soil-binder composite material that is created enhances the soil's overall engineering properties, increases the soil's strength, lowers permeability to water, and reduces the soil's compressibility and settlement.

The District designed the proposed creek channel in the Project area to be stable and confined within the intended channel areas during storm and flood events, with balanced sediment loads. Channel design was informed by two analyses developed by the District:

- Draft Sediment Transport Analysis, which utilized a HEC-RAS sediment transport capacity module to determine sediment transport capacity using bankfull design flow. The analysis compared the existing upstream reach and the proposed reach to determine a channel slope that could accommodate anticipated sediment volumes (SCVWD, 2017a).
- Bankfull Discharge Analysis, which utilized a HEC-RAS hydraulic model to determine the effective discharge for Alamitos Creek just upstream of Almaden Lake in order to appropriately size the proposed creek channel (SCVWD, 2016a).

Tie-in locations (i.e., the location at which the grade of the proposed levee would blend into the existing park) would occur at the north and south ends of the new levee along both sides of the restored creek section as identified on Figures 2-2 and 2-3. At the north tie-in location of the new levee, the existing area would be raised to blend the slope of the levee with the contours of the park. The levee would have an armored aggregate finish surface. The top of the levee ~~and~~ would be utilized both as a road for District and Park maintenance vehicles and as a pedestrian pathway. The new road would be surfaced with permeable aggregate base. The pedestrian pathway would connect with the existing Guadalupe River Trail at the north end of the lake and with the existing Los Alamitos Creek Trail at the south end of the lake. As noted with the north tie-in location above, minor grade modifications would be made to approximately 150 linear feet of the existing Guadalupe River Trail at the north end of the lake to match the finished grade of the proposed levee.

Boat House and Boat Launch Ramp Relocation

The Project calls for the relocation of the existing boat house and boat launch ramp for the City operated pedal boats, located on the west bank of the existing lake. Relocation is necessary to maintain the facilities' connection to the lake area. The existing westerly boat launch and boathouse would be relocated to the southern bank of Almaden Lake near the existing boat launch ramp, with input and direction regarding the siting requirements of these structures provided by the City of San José (City of San José, 2018), as shown on Figure 2-2.

Alamitos Creek Maintenance Access Ramps

The Project would install three ~~two creek~~ maintenance access ramps and one maintenance pathway intended for use by the District's operation and maintenance staff. The maintenance access ramps and pathway would not be open to the public. The ramps and pathway would be used to perform creek maintenance, as required. One creek ramp would be constructed on the west bank of the downstream end of the restored channel section, and the second creek ramp would be constructed on the east bank of the upstream end of the restored channel section, as shown in Figure 2-2. (SCVWD, 2015c; SCVWD, 2015d). In addition, a ramp would be installed at the location of the new pump station. The maintenance pathway would be constructed in a ~~west to east~~ north to south direction on the ~~west~~ east side of the upstream end of the ~~restored channel section~~ new levee.

Separated Almaden Lake

The Project would separate Almaden Lake from Alamitos Creek, and the lake would reduce in area from a 32-acre lake to a ~~17~~ 15-acre lake (Figure 2-2). The Project would re-contour the bottom of Almaden Lake to eliminate the existing submerged remnant quarry dikes and pits. Once re-contoured, existing mercury laden sediment would be capped with at least ~~2.5~~3 feet of clay/levee fill material.[5] The final lake depth would be approximately 26 to 28 feet, with the deepest areas located at the center of the lake. The proposed lake bottom contour would gradually slope up to meet the toe of the lake's existing and proposed westerly embankments. The proposed westerly lake embankment would be sloped similar to the existing lake's bank slopes at approximately 2H:1V. Relative to a lake water level ranging from 188 feet to 190 feet above msl (consistent with existing conditions), the height of the proposed levee would be approximately 14 to 16 feet above the lake water surface.

It is estimated that the Project would require approximately ~~600~~ 300 acre-feet of water to fill the re-contoured and capped lake following construction. A water budget prepared for maintaining the lake determined that approximately 7.5 cubic feet per second (cfs) of water would be needed in the summer months to circulate through the lake to maintain water quality to support recreational uses (equivalent to about 450 acre-feet a month). The

[5] The clay and levee fill material would consist of the same material and be in accordance with Levee Fill Material as specified in the District's Levee Safety Technical Guidance Manual. According to the District's Levee Safety Technical Guidance Manual, levee fill material is defined as soil free of organic matter, deleterious substances, debris and rocks or lumps larger than four inches in the greatest dimension; no more than 15 percent of the rocks or lumps are larger than 2-1/2 inches; at least 75 percent of the material is finer than No. 4 U.S. Standard Sieve and 50 percent is finer than No. 200 U.S. Standard Sieve; the plasticity index is between 10 and 20 percent; and hydraulic conductivity is 10^{-6} centimeter per second or less (SCVWD, 2002).

remainder of the year would be slightly less (approximately 5 cfs) for a total of approximately 4,~~350~~ 380 AFY. To circulate the water, an equal amount of water would be pumped from the lake via an outlet structure into a new pipeline connecting to ~~Los~~ Alamitos Percolation Pond or Los Capitancillos Percolation Ponds. A discussion of water supply contingencies in the event of drought conditions is included in the Water Management in Almaden Lake: Flow-Through System to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds section, below.

Open Park Area Conversion

On the westerly side of the Project area, the Project would expand the open park area into the existing west beach and its adjacent open water area by approximately two acres. A berm with a 10-foot-wide pedestrian path on top that would be built to an approximate elevation of 201 feet NAVD would separate the restored creek channel from the new open park area as described in the sections above.

The Project would convert a 1.6-acre open water area and 0.4 acres of the existing beach into an open park area. The 1.6-acre converted open park area immediately adjacent to the restored top of the creek bank would be mulched and planted with trees and riparian vegetation. The landscaping and open space use of the converted park area would be determined by the City. The 0.3-acre park area in the vicinity of the existing boathouse would be retained (Figure 2-2). Security lighting would not be required beyond what is already present in the Park.

New and Expanded Islands

The Project would expand the existing island, and create a second island in the proposed lake area. In several places, the existing island's outer banks are unstable. To stabilize these areas, the existing island's east and west shores would be excavated, while the north and south shores would be expanded, creating an island with a total area of approximately 0.75 acres. The Project proposes construction of a second approximate 0.75-acre island to the north of the existing island, to provide lake complexity and to break the water surface to discourage use by ~~sea~~gulls, whose fecal matter impairs water quality by accelerating growth of algal blooms. The two islands would each be between 120 feet and 240 feet in length, with gradient side slopes between 1H:1V and 2H:1V. The perimeter of the expanded existing island would be approximately 700 feet, and the perimeter of the new island would be approximately 785 feet. Public access to the islands would be prohibited.

Water Management in Almaden Lake: Flow-Through System to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds

The District would maintain a lake water level ranging from 188 feet to190 feet above msl (consistent with existing conditions) under the Project. The District assessed several potential water supply sources for the lake, using the following criteria to select a preferred option:

- Be available and adequate to fill and maintain the lake level during non-drought years once the lake is separated from Alamitos Creek.
- Minimize impacts to water supply operations, including maintaining the District's water rights.
- Maintain water quality in Almaden Lake for non-contact uses.
- Minimize operational costs (SCVWD, 2018b).

Almaden Valley Pipeline Water Source

As a result of the water source analysis, the District proposes a flow-through system that uses imported water from Almaden Valley Pipeline as the water source for the lake, allows water circulation within the lake, and discharges water from the lake via a pipeline to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds. Among other factors, imported water from Almaden Valley Pipeline contains less mercury than water from the Guadalupe River Watershed (with its direct link to the decommissioned New Almaden Quicksilver Mine). Utilizing imported water would minimize the direct reintroduction of mercury-laden sediment to the lake.

The proposed flow-through water management system would provide a continual flow of water through Almaden Lake to improve water quality. The flow-through system would circulate approximately 7.5 cfs of water through the lake from May through September, and about 5.0 cfs during October through April, equivalent to approximately 4,350 AFY that would pass through the lake provided that there is sufficient imported water available and capacity in Alamitos Percolation Pond or Los Capitancillos Percolation Ponds. No changes to District water rights would be required to implement this system.

There could be times when the District would not be able to provide Almaden Valley Pipeline water to Almaden Lake, including due to drought conditions,[6] insufficient imported water supply, periodic system maintenance, or higher pressing water supply needs elsewhere in the Santa Clara County.

Imported water from Almaden Valley Pipeline would be accessed via the Almaden Valley Pipeline, which is approximately 0.5 miles upstream of Almaden Lake Park east of Alamitos Creek. An approximately ~~2,590~~3,600-foot underground pipe would be constructed to deliver imported water from the Almaden Valley Pipeline to Almaden Lake. The proposed pipeline would be sized to accommodate flows of 5 cfs to 10 cfs. The ~~16-inch~~ 14-inch diameter pipe would be gravity fed and aligned along McAbee Road, along the edge of a City maintenance facility, and under ~~Los~~ Alamitos Creek ~~the west side of Crossview Circle/Court and cut in to the east side of the Los Alamitos Creek Trail, and would traverse southern parkland at Almaden Lake Park~~ to the intake location on the southern end of Almaden Lake (Figure 2-4). A power source connection would be made at the intake location.

[6] During drought periods when there may be insufficient imported water to supply the lake, the District may temporarily suspend pumping lake water to the percolation ponds.



SOURCE: Santa Clara Valley Water District

Almaden Lake Improvement Project. 130679

Figure 2-4 (Revised)

Almaden Valley Pipeline Alignment

Outlet to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds

Water from Almaden Lake would be pumped via an approximately ~~2,000 to~~ 2,600-foot long, ~~24-inch~~ 16-inch diameter pipeline to ~~Los~~ Alamitos Percolation Pond or Los Capitancillos Percolation Ponds, where it would be used for groundwater recharge. Discharge to the percolation ponds would be based on available capacity of each pond at the time of discharge.

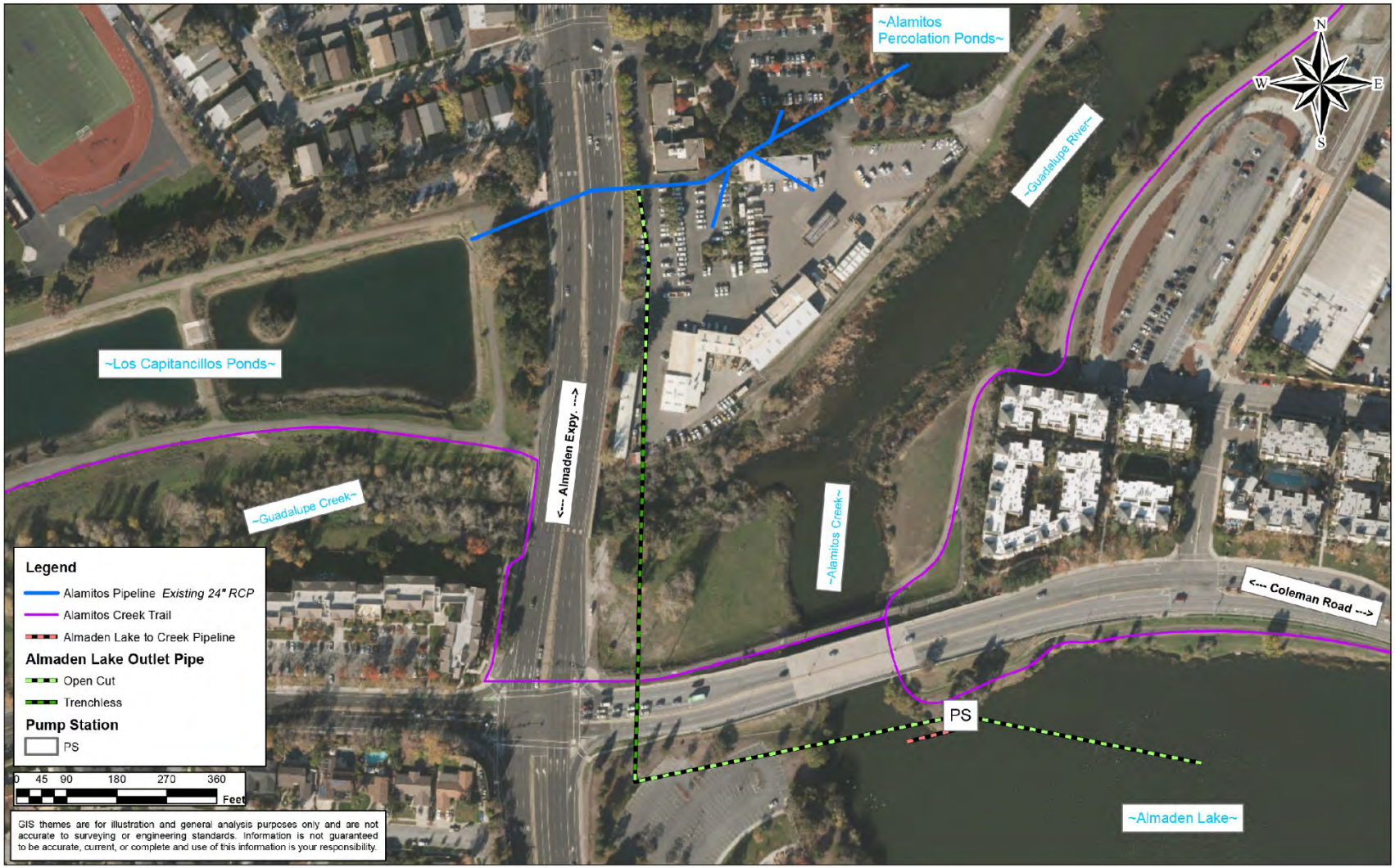
Water would be conveyed through an outlet structure and pipeline that would be constructed at the north end of the lake. The alignment would extend to a pump station located on a bench on the northeastern side of the new levee ~~through the northern end of the new levee and under the restored creek section near Coleman Road~~ (Figure 2-5). ~~The alignment would connect to either Pump Station A (underground pump station, described in Pump Station section, below) located in the northeast corner of the Almaden Lake Park parking lot or Pump Station B (aboveground pump station, described in Pump Station section, below) located on the northern end of the new levee.~~ The alignment would continue west under the Almaden Lake Park parking lot to the corner of Almaden Expressway and Coleman Road, and then would extend under Coleman Road ~~north parallel to the northbound Almaden Expressway roadway, crossing under Coleman Road~~, the City of San José property at the northeast corner of Almaden Expressway and Coleman Road, and Guadalupe Creek, and would continue ~~continuing~~ north on District property to connect with the existing transfer pipeline between Los Capitancillos Percolation Ponds and ~~Los~~ Alamitos Percolation Pond.

Adequate capacity would need to be available in the ~~Los~~ Alamitos Percolation Pond or Los Capitancillos Percolation Ponds to transfer water (SCVWD, 2018b). ~~Los~~ Alamitos Percolation Pond could be periodically unavailable due to drought conditions,[7] maintenance, use of the Pond for local water to utilize water rights, or due to high groundwater levels (when the groundwater basin is full and additional recharge is not desired). During times when the Pond is unavailable, Almaden Lake overflow water could be discharged to ~~Los Capitancillos Percolation Ponds~~ Alamitos Creek. ~~Alamitos Creek via an outlet pipeline connected to the pump station. There are two potential alignments for this outlet pipeline shown in Figure 2-5. One alignment connects directly from the lake to the creek and would be controlled via a valve. The other alignment connects from the Pump Station A to the creek. The alignment would be selected during design based on operation and maintenance considerations.~~

Pump Station

The Project would include a pump station to pump water from Almaden Lake to the Alamitos Pipeline, an existing 24-inch transmission pipe that connects the ~~Los~~ Alamitos Percolation Pond and the Los Capitancillos Percolation Ponds. Valves would be installed at the connection point, to allow water to flow to the ~~Los~~ Alamitos Percolation Pond or the Los Capitancillos Percolation Ponds. The pump station would also include a discharge pipeline to Alamitos Creek in the event that Almaden Lake water could not be transferred to the ~~Los~~ Alamitos

[7] During drought periods when there may be insufficient imported water to supply the lake, the District may temporarily suspend pumping lake water to the percolation ponds.



SOURCE: Santa Clara Valley Water District

Almaden Lake Improvement Project . 130679

Figure 2-5 (Revised)

Outlet to Los Alamitos Percolation Pond/Los Capitancillos Percolation Ponds

Percolation Pond/Los Capitancillos Percolation Ponds. Flows would typically range ~~at flows~~ between 5 cfs and 7.5 cfs, with a maximum design flowrate of ~~to~~ 16~~5~~ cfs~~, with a total capacity of 20 cfs~~. The pump station would consist of ~~one to~~ two to three operating pumps, ~~each approximately 135 HP, running simultaneously with~~ and ~~one~~ two backup pumps~~ to achieve the 20 cfs capacity~~, each approximately 40 HP and running as required to provide a range of flows. The pump station would ~~either~~ be housed ~~in an aboveground structure or~~ within a partially buried structure, with the electrical housing above grade (see Figure 2-5). A power source connection would be made via a new transformer or to one of two PG&E transformers in the vicinity, one near the intersection of Coleman Road and Winfield Boulevard and one directly across Coleman Road. ~~The Project would implement one of two pump station options, depending on the outlet pipeline alignment selected during Project design:~~

- ~~Pump Station A would be an above-ground pump station structure housing the operating and backup pumps. Pump Station B would be in the northeast corner of the Almaden Lake Park parking lot, and would pump outlet water for Alignment 1 (Figure 2-5).~~
- ~~Pump Station B would be a deep well underwater pump station located in the northwestern corner of the reconfigured lake, and would pump outlet water for pipeline Alignment 2 (Figure 2-5). Pump Station A would be constructed of stackable, large diameter concrete rings with submersible pumps on rails.~~

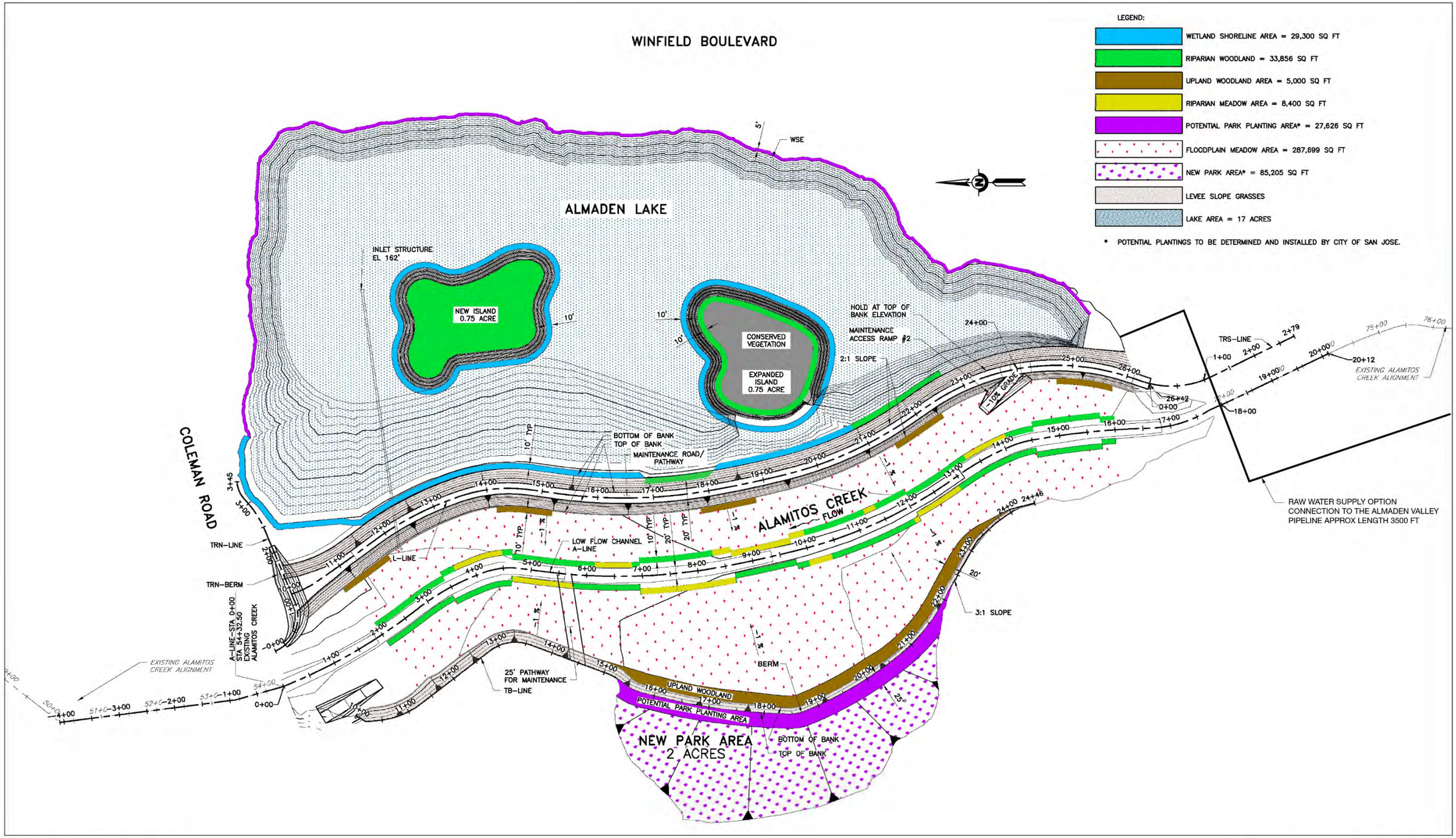
The pump station would include an outlet pipeline to Alamitos Creek in the event that Almaden Lake water could not be transferred to ~~Los~~ Alamitos Percolation Pond, and would need to be released into Alamitos Creek.

Solar Bees

The District would continue water circulation improvements in Almaden Lake by increasing the number of SolarBee circulators in the lake. The SolarBees circulate the water column in the lake and alleviate the anoxic (i.e., low oxygen) conditions that contribute to the formation of methylmercury. The four existing SolarBee circulators improve circulation in the top of the water column (i.e., the epilimnion), but do not circulate water in the deep former quarry pits. The Project would increase the number of SolarBees to a total of seven. Two of the new SolarBee circulators would be installed within the deep waters of the lake to improve the overall mixing of water near the lake bottom (i.e., the hypolimnion). Circulation of the hypolimnion would likely be improved once the lake bottom has been contoured. The third new SolarBee circulator would be installed within the shallow lake waters to improve the circulation of water within the epilimnion, where algae blooms are known to occur during the summer months.

Native Revegetation

Upon completion of construction, native vegetation would be planted along the banks and floodplain of the restored Alamitos Creek (adjacent to the new lake edge and expanded park area), and the banks of the enlarged and new islands (SCVWD, 2015a). Figure 2-6 depicts a conceptual revegetation plan. The intent of the native revegetation would be to maximize the habitat benefits and long-term sustainability of the Project and ensure exceptional quality



SOURCE: Santa Clara Valley Water District

Almaden Lake Improvement Project . 130679

Figure 2-6 (Revised)

Conceptual Revegetation Plan

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habitat. The revegetation would help stabilize the newly restored channel morphology, shade the channel helping moderate water temperature, and provide habitat structure and diversity. All plants utilized for revegetation in these areas would be native plant species consistent with existing Alamitos Creek upstream channel vegetation, consistent with the District's Water Resources Protection Manual (SCVWD, 2006), appropriate to the post-construction site conditions (e.g., depths to groundwater, inundation frequency, and aspect), and can be acquired locally and commercially. Figure 2-7 illustrates conceptual planting details for typical riffle and pool segments of the restored creek channel.

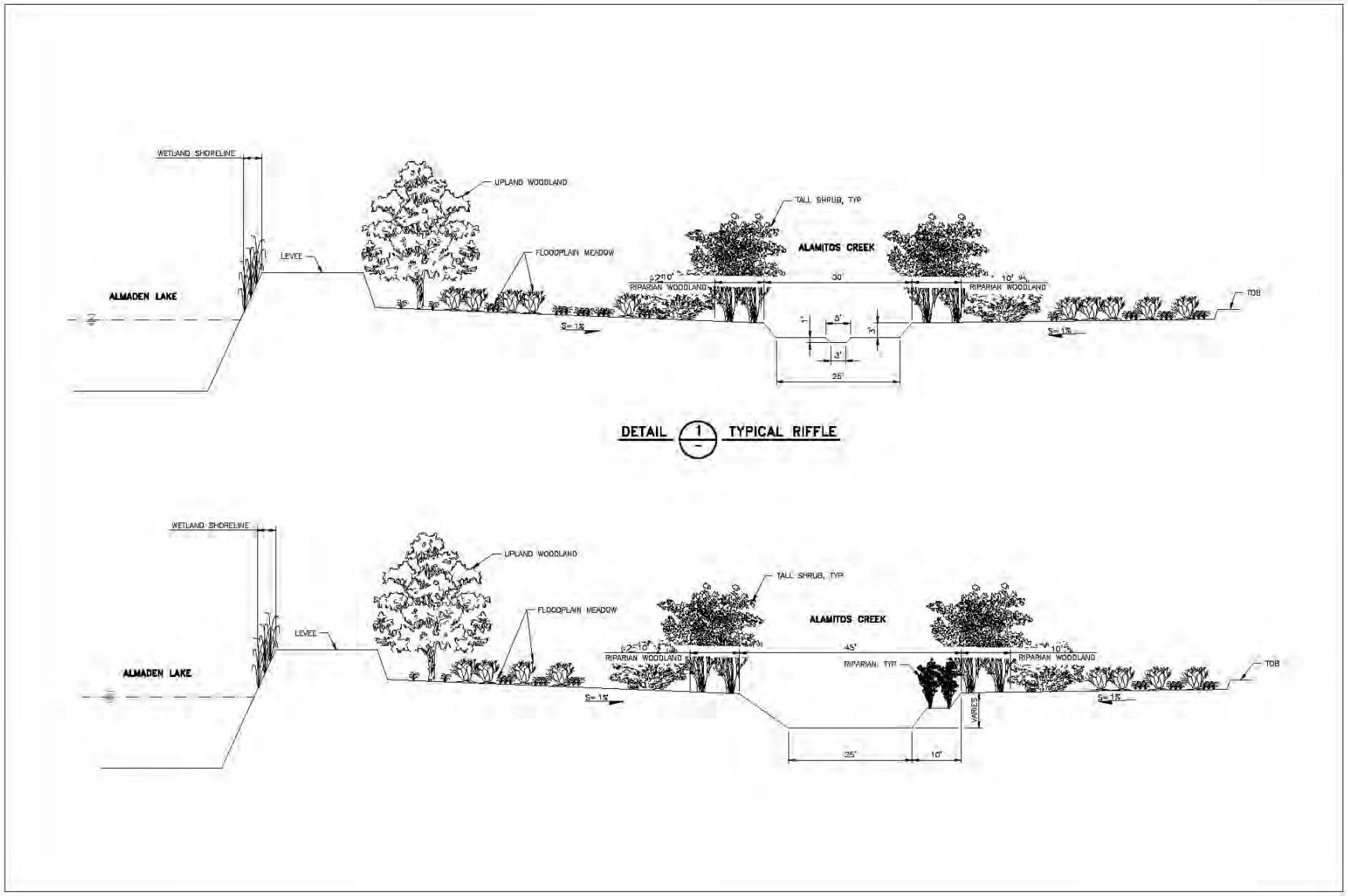
The banks and lower floodplain of the restored channel would be planted with a corridor of native riparian trees and shrubs, such as various willows (*Salix* spp.), box elder (*Acer negundo*), mulefat (*Baccharis salicifolia*), and California blackberry (*Rubus ursinus*). These tree and shrub plantings would be interspersed with patches of wetland forbs, such as Pacific aster (*Symphyotrichum chilense*), western goldentop (*Euthamia occidentalis*), California mugwort *(Artemisia douglasiana)*, and flatsedge (*Cyperus* spp.).

The upper floodplain of the restored channel would be planted with native herbs and grasses, such as California poppy (*Eschscholzia californica*), California goldenrod (*Solidago velutina* ssp. *Californica*), blue wildrye (*Elymus glaucus*), common rush (*Juncus* spp.), and various milkweeds (*Asclepias* spp.). These plantings would be interspersed with patches of upland trees and shrubs, such as western sycamore (*Platanus racemosa*), coast live oak (*Quercus agrifolia*), California buckeye (*Aesculus californica*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), black sage (*Artemisia arbuscula*), and buckwheat (Eriogonum spp.). Planted areas would include the base of the lake- and park-side levees to stabilize floodplain soils and provide pollinator and bird habitat that is compatible with the conveyance of high flows across the floodplain.

The new lake shore and banks of the islands would be planted with wetland and aquatic species, such as yellow pond lily (*Nuphar lutea*), pondweeds (*Potamogeton* spp.), hornwort (*Ceratophyllum demersum*), pennywort (*Hydrocotyle* spp.), arrowhead (*Sagittaria* spp.), and bulrush (*Schoenoplectus acutus*). These bank and shoreline plantings would stabilize the banks and promote oxygenation of the lake. In total, the Project would install up to eight acres of locally sourced, native vegetation. In addition, two acres of open water and beach would be converted to park area would be planted in coordination with the City of San José Parks Department.

Summary of Fisheries Benefits

The Project elements identified above have been designed to benefit local, native fish populations by improving anadromous fish passage and riverine habitat, reducing non-native fish predation, reducing water temperatures and mercury methylation, and improving ecosystem function. These fish-related improvements are discussed below, and include beneficial effects on water quality to the creek by removing the artificial connection between Alamitos Creek and the lake. Note that the impact analysis contained in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures provides an assessment of



SOURCE: Santa Clara Valley Water District

Almaden Lake Improvement Project . 130679

Figure 2-7

Conceptual Riffle and Pool Planting Details

impacts that would occur as a result of implementation of the Project. The following discussion is meant to summarize the intent behind the proposed Project design.

Improved Anadromous Fish Passage

The proposed restored channel within the Almaden Lake footprint would eliminate migrating native fish from having to pass through the lake, and also eliminate the potential for native fish entrainment in the lake. Specifically, the approximately 1,800 linear feet of proposed channel along with water management practices would restore attraction flows for upstream migration, and allow improved juvenile fish migration within the restored channel separated from the lake. The improved passage conditions would support improved access to over 6.5 miles of Alamitos Creek and over 3.0 miles of Calero Creek.

Improved Riverine Habitat

The proposed channel restoration would facilitate natural sediment transport, allowing for movement of spawning gravel and the creation of a geomorphically stable channel. Natural sediment dynamics would facilitate the development of aquatic habitat features that are essential to suitable habitat for native fish, such as deposition of gravel for spawning, pools for rearing, and riffles for food production.

Reduced Predation

By restoring the channel, the Project would prevent native fish from swimming into Almaden Lake, which is preferred habitat for non-native predatory fish. Instead, native fish would be within the restored channel separated from the lake. The restored channel would have temperature and flows that are less conducive to non-native predatory species. Of the approximately 1,800 linear feet (0.32 miles) of creek section proposed for restoration, up to approximately 1,300 ~~only about 200~~ linear feet of the new channel would remain as an impoundment when the flashboard dam is in place between April and December, which is generally outside of the migration periods of native anadromous fish. ~~when the flashboard dam is in place, generally outside of migration periods of native fish, typically between December and April~~. At times when the flashboard dam is not in place, the restored creek section would function as continuous riverine habitat.

Reduced Water Temperature

In a natural river system, cool water from headwater streams flows downstream and gradually warms. Shading by riparian vegetation and natural riverine processes moderate that warming. In the presence of Almaden Lake, cool inflow becomes entrained in the lake. Due to the lake's large volume and direct exposure to sunlight, its water is frequently heated to levels that can reduce reproductive success of salmonids and rearing potential (SCBWMI, 2003). This water, warmed by the lake, is then discharged downstream into the Guadalupe River. By removing the warming influence of the lake, allowing water to flow through the restored channel, and providing a shaded river corridor, warming is expected to be reduced during passage of water through the Project area.

Reduced Mercury Methylation

The proposed Project would reduce mercury methylation in the lake. The Project would cap existing mercury in the lake bottom, and create a flow-through lake system utilizing an imported water source with lower elemental mercury content, removing the direct linkage of Alamitos Creek water flowing into the lake and eliminating the deposition of elemental mercury into the lake from upstream sources. Furthermore, the SolarBee control measures would circulate lake water, and assist with alleviating anoxic conditions that favor the formation of methylmercury.

Improved Ecosystem Function

The proposed creek/lake separation would create new lake and stream margins planted with native species, resulting in an increase in wetland, riparian, and upland vegetation. The channel, bank, and floodplain grading would create physically-appropriate locations for a variety of vegetation types. This increase in vegetation, particularly of native species that are appropriate for the restored conditions, would enhance ecosystem function associated with these vegetation types.

Summary of Recreation Benefits

The Project elements identified above have been designed to address key water quality, fish, and other issues, while also supporting existing recreational use of Almaden Lake Park by the surrounding community. Existing recreational uses would continue at the Park, with some facilities improvements as described below to enhance existing recreational uses.

The proposed features of the Project have been designed to minimize changes to existing recreational features, as described below. Note that the impact analysis contained in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures provides an assessment of potential impacts associated with implementation of the Project. The following discussion is meant to summarize the intent behind the proposed Project design.

New Trails/Walking Paths

The Project would create ~~a~~ new trails/walking paths along the proposed levee that would separate Alamitos Creek and Almaden Lake and the berm that would separate Alamitos Creek from the new open park area. This pedestrian trails would provide a walking path that would allow opportunities for bird watching, observing the restored river channel, and strolling. ~~This~~ These trails would tie into the existing, highly utilized Los Alamitos Creek and Guadalupe River trails, enhancing opportunities for visitors to traverse the Park, and would contribute to the regional urban trail system.

Enhanced Bird and Wildlife Viewing Opportunities

The proposed island reconfiguration and the construction of a new island in the lake would be designed to create beneficial habitat for resident and migratory birds, as well as ~~and~~ bird watching opportunities for the public. This island habitat would also provide educational opportunities for local school children to observe a variety of species and gain an

understanding of ecosystem functions. The development of a riparian corridor and other native habitat types along the restored creek channel and floodplain would also increase habitat for birds, further enhancing bird and wildlife watching opportunities.

New Open Park Area

The establishment of new open park area along the west side of the Park would provide opportunities for the City to create additional park features such as green space, event space, picnic areas, or educational opportunities for Park visitors.

Summary of Net Benefits to Waters of the State

The Project has been designed to benefit native fisheries and improve water quality in Alamitos Creek and Almaden Lake, which are waters of the U.S. and of the State. These improvements, along with the Project's maintenance of water supply and recreational uses, ~~will~~ would conserve approximately 15 acres of Almaden Lake open water but would require the conversion of approximately 16 acres of open water to primarily creek, floodplain, and wetland habitat; as well as to small areas of upland habitat. However, due to the degraded conditions of Almaden Lake, these conversions would provide net benefits to the waters of the U.S. and the State. Table 2-2 summarizes the Project's net effect on current and potential beneficial uses of waters in the Project footprint, based on the uses listed for Alamitos Creek in the San Francisco Bay Basin Plan (RWQCB, 2019). Of 11 existing or potential beneficial uses, the Project would increase or improve seven and maintain four. There would be no detriment to any beneficial use despite the conversion of open water.

The net benefit of the Project to waters of the State has been recognized by the Regional Board. In 2018, the Regional Board published a memo in support of accepting the Project to comply with the Regional Board's Order for the Upper Berryessa Creek Flood Risk Management Project. That memo concluded that the Project would enhance the COLD, RARE, MIGR, SPWN, and WILD beneficial uses of Alamitos Creek, and that these improvements would extend downstream to San Francisco Bay and upstream to Almaden Dam and Calero Dam, for a total of 28 miles. As such, the Regional Board found that the Project's enhancement to water quality and beneficial uses would more than compensate for the Project's temporary construction impacts, permanent habitat conversions, and the impacts of the District's Upper Berryessa Project.

The lake would benefit due to smoothing the bed of the lake to improve water circulation and the capping of the existing substrate to minimize the production of methylmercury. These changes would enhance the REC-1, WARM, and WILD beneficial uses of the lake. The REC-2 beneficial use would also be improved, providing a more inviting water-related recreational opportunity with a continuous loop trail loop around the lake within the park.

Planting of riparian and wetland vegetation in the restored channel would improve the creek's functions and values by providing shade and enhancing nutrient cycling and pollutant filtration.

TABLE 2-2
SUMMARY OF PROJECT BENEFITS TO WATERS OF THE STATE

Beneficial Use	Summary of Project Baseline	Summary of Project Benefit	Net Project Effect
Cold Freshwater Habitat (Cold)	None; Almaden Lake does not currently support this beneficial use	Increased area of suitable habitat in restored Alamitos Creek and improved quality of habitat in Guadalupe River	Beneficial
Freshwater Replenishment (Frsh)	None; Almaden Lake does not currently support this beneficial use	Improved water quality in Guadalupe River and SF Bay	Beneficial
Groundwater Recharge (Gwr)	Maintained groundwater recharge infrastructure and capacity		No change
Fish Migration (Migr)	~~Reduced area of~~Poor passage conditions and high predation risk through the lake	Increased area of suitable riverine passage conditions; reduced predation risk to migrating fish	Beneficial
Municipal And Domestic Supply (Mun)	Maintained water supply-related infrastructure and capacity		No change
Preservation Of Rare And Endangered Species (Rare)	~~Reduced area of l~~Low-quality lacustrine habitat that threatens rare fish passage and predation, and the health of multiple rare species	Increased area of suitable habitat for rare fish passage and rearing; lower risk of bioaccumulation of mercury for multiple rare species	Beneficial
Water Contact Recreation (Rec1)	None; Almaden Lake does not currently support this beneficial use	None; although reduced suitable habitat for geese and potential for algal blooms may help support this	No change
Noncontact Water Recreation (Rec2)	Maintained noncontact water recreation opportunities		No change
Fish Spawning (Spwn)	None; Almaden Lake does not currently support this beneficial use	Small increase in suitable spawning substrate in the restored Alamitos Creek channel; improved access to suitable spawning areas upstream	Beneficial
Warm Freshwater Habitat (Warm)	Reduced area of warm freshwater habitat	Improved quality of conserved and downstream warm freshwater habitat	Beneficial
Wildlife Habitat (Wild)	Reduced area of open water and shoreline habitat	Increased diversity of wildlife habitat types and increased area of riverine, floodplain, and wetland habitats	Beneficial

2.E Project Construction

2.E.1 Avoidance and Minimization Measures

Avoidance and minimization measures are parameters built into the design of the Project and are committed to as part of Project implementation. Measures included those takes from the Santa Clara Valley Water District Best Management Practices Handbook (BMP Handbook) and from the Santa Clara Valley Habitat Plan.

District Best Management Practices

The District developed, and regularly updates, the BMP Handbook, which provides a comprehensive list of District best management practices (BMPs) that are regularly implemented in the design, development, and construction of District projects with the purpose of avoiding or minimizing adverse environmental effects (SCVWD, 2014a). Relevant BMPs have been incorporated into the Project, and are identified in the impact analyses in Chapter 3.

BMPs to be utilized in the Project:

BI-2: Minimize Impacts to Steelhead. Minimize potential impacts to salmonids by avoiding routine use of vehicles and equipment in salmonid streams between January 1 and June 15.

BI-3: Remove Temporary Fills. Temporary fill materials, such as for diversion structures or cofferdams, will be removed upon finishing the work or as appropriate. The creek channels and banks will be re-contoured to match pre-construction conditions to the extent possible. Low-flow channels within non-tidal streams will be contoured to facilitate fish passage and will emulate the preconstruction conditions as closely as possible, within the finished channel topography.

BI-5: Avoid Impacts to Nesting Migratory Birds. Nesting birds are protected by state and federal laws. The District will protect nesting birds and their nests from abandonment, loss, damage, or destruction. Nesting bird surveys will be performed by a qualified biologist prior to any activity that could result in the abandonment, loss, damage, or destruction of birds, bird nests, or nesting migratory birds. Inactive bird nests may be removed with the exception of raptor nests. Birds, nests with eggs, or nests with hatchlings will be left undisturbed.

BI-6: Avoid Impacts to Nesting Migratory Birds from Pending Construction. Nesting exclusion devices may be installed to prevent potential establishment or occurrence of nests in areas where construction activities would occur. All nesting exclusion devices will be maintained throughout the nesting season or until completion of work in an area makes the devices unnecessary. All exclusion devices will be removed and disposed of when work in the area is complete.

BI-7: Minimize Impacts to Vegetation from Survey Work. Survey cross-sections will be moved, within acceptable tolerances, to avoid cutting dense riparian vegetation and minimize cutting of woody vegetation, taking advantage of natural breaks in foliage. If the cross-section cannot be moved within the established acceptable tolerances to avoid impacts to dense riparian or woody vegetation, the survey section will be abandoned.

BI-8: Choose Local Ecotypes of Native Plants and Appropriate Erosion-Control Seed Mixes. Whenever native species are prescribed for installation the following steps will be taken by a qualified biologist or vegetation specialist:

1. Evaluate whether the plant species currently grows wild in Santa Clara County; and,
2. If so, the qualified biologist or vegetation specialist will determine if any need to be local natives, i.e. grown from propagules collected in the same or adjacent watershed, and as close to the project site as feasible.

Also, consult a qualified biologist or vegetation specialist to determine which seeding option is ecologically appropriate and effective, specifically:

1. For areas that are disturbed, an erosion control seed mix may be used consistent with the SCVWD *Guidelines and Standards for Land Use Near Streams, Design Guide 5, 'Temporary Erosion Control Options.'*
2. In areas with remnant native plants, the qualified biologist or vegetation specialist may choose an abiotic application instead, such as an erosion control blanket or seedless hydro-mulch and tackifier to facilitate passive revegetation of local native species.
3. Temporary earthen access roads may be seeded when site and horticultural conditions are suitable.
4. If a gravel or wood mulch has been used to prevent soil compaction, this material may be left in place [if ecologically appropriate] instead of seeding.

Seed selection shall be ecologically appropriate as determined by a qualified biologist, per *Guidelines and Standards for Land Use Near Streams, Design Guide 2: Use of Local Native Species*.

BI-9: Restore Riffle/Pool Configuration of Channel Bottom. The channel bottom shall be re-graded at the end of the work project to as close to original conditions as possible.

In salmonid streams, restore pool and riffle configurations to emulate pre-project instream conditions, taking into account channel morphological features (i.e., slope), which affects riffle/pool sequence.

HM-1: Comply with All Pesticide Application Restrictions and Policies. Pesticide products are to be used only after an assessment has been made regarding environmental, economic, and public health aspects of each of the alternatives by the District's Pest Control Advisor (PCA). All pesticide use will be consistent with approved product specifications. Applications will be made by, or under the direct supervision of, State Certified applicators under the direction of, or in a manner approved by the PCA. Refer to Q751D02, *Control and Oversight of Pesticide Use*.

HM-2: Minimize Use of Pesticides. In all cases, where some form of pest control is deemed necessary by the PCA; evaluate alternative pest control methods and pesticides. Refer to Q751D02: *Control and Oversight of Pesticide Use*.

HM-3: Post Areas Where Pesticides Will Be Used. Posting of areas where pesticides are to be used shall be performed in compliance with Q751D02: *Control and Oversight of Pesticide Use.* Posting shall be performed in compliance with the label requirements of the product being applied.

In addition, the District shall provide posting for any products applied in areas used by the public for recreational purposes, and areas readily accessible to the public, regardless of whether the label requires such notification (the posting method may be modified to avoid destruction of bait stations or scattering of rodenticide), including:

1. Sign postings shall notify staff and the general public of the date and time of application; the product's active ingredients, and common name; and, the time of allowable re-entry into the treated area.
2. A District staff contact phone number shall be posted on the sign.
3. Signs shall not be removed until after the end of the specified re-entry interval.

4. Right-to-know literature on the product shall be made available upon request to anyone in the area.
5. Notification will take into account neighbors with specific needs prior to treatment of an adjacent area to ensure such needs are met. Such requests are maintained by the District under Q751D02.

HM-4: Comply with All Pesticide Usage Requirements. All projects that propose ongoing use of pesticides will comply with all provisions of Q751D02: *Control and Oversight of Pesticide Use*, including, but not necessarily limited to the following:

1. All pest control methods will be performed only after a written Pest Control Recommendation for use has been prepared by the District's PCA in accordance with requirements of the California Food and Agricultural Code.
2. F751D01 – *Pest Control Recommendation & Spray Operators Report* will be completed for each pesticide application.

HM-5: Comply with Restrictions on Herbicide Use in Upland Areas. Consistent with provisions of Q751D02: *Control and Oversight of Pesticide Use,* application of pre emergence (residual) herbicides to upland areas will not be made within 72 hours of predicted significant rainfall. Predicted significant rainfall for the purposes of this BMP will be described as local rainfall greater than 0.5 inch in a 24-hour period with greater than a 50% probability of precipitation according to the National Weather Service.

HM-6: Comply with Restrictions on Herbicide Use in Aquatic Areas. Consistent with provisions of Q751D02: *Control and Oversight of Pesticide Use,* only herbicides and surfactants registered for aquatic use will be applied within the banks of channels within 20 feet of any water present.

Furthermore, aquatic herbicide use will be limited to June 15th through October 31st with an extension through December 31 or until the first occurrence of any of the following conditions; whichever happens first:

1. local rainfall greater than 0.5 inches is forecasted within a 24-hour period from planned application events according to the National Weather Service; or
2. when steelhead begin upmigrating and spawning in the 14 steelhead creeks, as determined by a qualified biologist (typically in November/December).

If rain is forecast then application of aquatic herbicide will be rescheduled.

HM-7: Restrict Vehicle and Equipment Cleaning to Appropriate Locations. Vehicles and equipment may be washed only at approved areas. No washing of vehicles or equipment will occur at job sites.

HM-8: Ensure Proper Vehicle and Equipment Fueling and Maintenance. No fueling or servicing will be done in a waterway or immediate flood plain, unless equipment stationed in these locations is not readily relocated (i.e., pumps, generators).

1. For stationary equipment that must be fueled or serviced on-site, containment will be provided in such a manner that any accidental spill will not be able to come in direct contact with soil, surface water, or the storm drainage system.
2. All fueling or servicing done at the job site will provide containment to the degree that any spill will be unable to enter any waterway or damage riparian vegetation.

3. All vehicles and equipment will be kept clean. Excessive build-up of oil and grease will be prevented.
4. All equipment used in the creek channel will be inspected for leaks each day prior to initiation of work. Maintenance, repairs, or other necessary actions will be taken to prevent or repair leaks, prior to use.
5. If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location will be done in a channel or flood plain.

HM-9: Ensure Proper Hazardous Materials Management. Measures will be implemented to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means.

1. Prior to entering the work site, all field personnel will know how to respond when toxic materials are discovered.
2. Contact of chemicals with precipitation will be minimized by storing chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage.
3. Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials will not contact soil and not be allowed to enter surface waters or the storm drainage system.
4. All toxic materials, including waste disposal containers, will be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water.
5. Quantities of toxic materials, such as equipment fuels and lubricants, will be stored with secondary containment that is capable of containing 110% of the primary container(s).
6. The discharge of any hazardous or non-hazardous waste as defined in Division 2, Subdivision 1, Chapter 2 of the California Code of Regulations will be conducted in accordance with applicable State and federal regulations.
7. In the event of any hazardous material emergencies or spills, personnel will call the Chemical Emergencies/Spills Hotline at 1-800-510-5151.

HM-11: Ensure Worker Safety in Areas with High Mercury Levels. To ensure worker safety is protected in areas with elevated mercury concentrations in exposed surfaces, personal protective equipment will be required during project construction to maintain exposure below levels established by the California Division of Occupational Safety and Health (Cal/OSHA).

HM-12: Incorporate Fire Prevention Measures.

1. All earthmoving and portable equipment with internal combustion engines will be equipped with spark arrestors.
2. During the high fire danger period (April 1–December 1), work crews will have appropriate fire suppression equipment available at the work site.
3. An extinguisher shall be available at the project site at all times when welding or other repair activities that can generate sparks (such as metal grinding) is occurring.
4. Smoking shall be prohibited except in designated staging areas and at least 20 feet from any combustible chemicals or vegetation.

WQ-3: Limit Impact of Pump and Generator Operation and Maintenance. Pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species.

1. Pumps and generators will be maintained according to manufacturers' specifications to regulate flows to prevent dry-back or washout conditions.
2. Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high water conditions, which creates ponding.
3. Pump intakes will be screened to prevent uptake of fish and other vertebrates. Pumps in steelhead creeks will be screened according to NMFS criteria.
4. Sufficient back-up pumps and generators will be onsite to replace defective or damaged pumps and generators.

WQ-5: Stabilize Construction Entrances and Exits. Measures will be implemented to minimize soil from being tracked onto streets near work sites:

1. Methods used to prevent mud from being tracked out of work sites onto roadways include installing a layer of geotextile mat, followed by a 4-inch thick layer of 1 to 3-inch diameter gravel on unsurfaced access roads.
2. Access will be provided as close to the work area as possible, using existing ramps where available and planning work site access so as to minimize disturbance to the water body bed and banks, and the surrounding land uses.

WQ-6: Limit Impact of Concrete Near Waterways. Concrete that has not been cured is alkaline and can increase the pH of the water; fresh concrete will be isolated until it no longer poses a threat to water quality using the following appropriate measures:

1. Wet sacked concrete will be excluded from the wetted channel for a period of four weeks after installation. During that time, the wet sacked concrete will be kept moist (such as covering with wet carpet) and runoff from the wet sacked concrete will not be allowed to enter a live stream.
2. Poured concrete will be excluded from the wetted channel for a period of four weeks after it is poured. During that time, the poured concrete will be kept moist, and runoff from the wet concrete will not be allowed to enter a live stream. Commercial sealants (e.g., Deep Seal, Elasto-Deck Reservoir Grade) may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If a sealant is used, water will be excluded from the site until the sealant is dry.
3. Dry sacked concrete will not be used in any channel.
4. An area outside of the channel and floodplain will be designated to clean out concrete transit vehicles.

WQ-9: Use Seeding for Erosion Control, Weed Suppression, and Site Improvement. Disturbed areas shall be seeded with native seed as soon as is appropriate after activities are complete. An erosion control seed mix will be applied to exposed soils down to the ordinary high water mark in streams.

1. The seed mix should consist of California native grasses, (for example *Hordeum brachyantherum*; *Elymus glaucus*; and annual *Vulpia microstachyes*) or annual, sterile hybrid seed mix (e.g., *Regreen*™, a wheat x wheatgrass hybrid).

2. Temporary earthen access roads may be seeded when site and horticultural conditions are suitable, or have other appropriate erosion control measures in place.

WQ-10: Prevent Scour Downstream of Sediment Removal. After sediment removal, the channel will be graded so that the transition between the existing channel both upstream and downstream of the work area is smooth, and continuous between the maintained and non-maintained areas, and does not present a sudden vertical transition (wall of sediment) or other blockage that could erode once flows are restored to the channel.

WQ-12: Manage Well or Exploratory Boring Materials. All materials or waters generated during drilling, well or exploratory boring construction, well development, pump testing, or other activities associated with wells or exploratory borings, will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statutes regulating such. In no case will these materials and/or waters be allowed to enter, or potentially enter, on- or off-site storm sewers, dry wells, or waterways. Such materials/waters must not be allowed to move off the property where the work is being completed.

WQ-13: Protect Groundwater from Contaminates Via Wells or Exploratory Borings. Any substances or materials that may degrade groundwater quality will not be allowed to enter any well or boring. Lubricants used on drill bits, drill pipe, or tremie pipe will not be comprised of oily or greasy substances or other materials that may degrade groundwater quality.

Well openings or entrances will be sealed or secured in such a way as to prevent the introduction of contaminants.

WQ-15: Prevent Water Pollution. Oily, greasy, or sediment laden substances or other material that originate from the project operations and may degrade the quality of surface water or adversely affect aquatic life, fish, or wildlife will not be allowed to enter, or be placed where they may later enter, any waterway.

The project will not increase the turbidity of any watercourse flowing past the construction site by taking all necessary precautions to limit the increase in turbidity as follows:

1. where natural turbidity is between 0 and 50 Nephelometric Turbidity Units (NTU), increases will not exceed 5 percent;
2. where natural turbidity is greater than 50 NTU, increases will not exceed 10 percent;
3. where the receiving water body is a dry creek bed or storm drain, waters in excess of 50 NTU will not be discharged from the project.

Water turbidity changes will be monitored. The discharge water measurements will be made at the point where the discharge water exits the water control system for tidal sites and 100 feet downstream of the discharge point for non-tidal sites. Natural watercourse turbidity measurements will be made in the receiving water 100 feet upstream of the discharge site. Natural watercourse turbidity measurements will be made prior to initiation of project discharges, preferably at least 2 days prior to commencement of operations.

WQ-16: Prevent Stormwater Pollution. To prevent stormwater pollution, the applicable measures from the following list will be implemented:

1. Soils exposed due to project activities will be seeded and stabilized using hydroseeding, straw placement, mulching, and/or erosion control fabric. These measures will be implemented such that the site is stabilized and water quality protected prior to significant rainfall. In creeks, the channel bed and areas below the Ordinary High Water Mark are exempt from this BMP.
2. The preference for erosion control fabrics will be to consist of natural fibers; however, steeper slopes and areas that are highly erodible may require more structured erosion control methods. No non-porous fabric will be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff, but only if there are no indications that special-status species would be impacted by the application.
3. Erosion control measures will be installed according to manufacturer's specifications.
4. To prevent stormwater pollution, the appropriate measures from, but not limited to, the following list will be implemented:
    - Silt Fences
    - Straw Bale Barriers
    - Brush or Rock Filters
    - Storm Drain Inlet Protection
    - Sediment Traps or Sediment Basins
    - Erosion Control Blankets and/or Mats
    - Soil Stabilization (i.e., tackified straw with seed, jute or geotextile blankets, etc.)
    - Straw mulch.
5. All temporary construction-related erosion control methods shall be removed at the completion of the project (e.g., silt fences).
6. Surface barrier applications installed as a method of animal conflict management, such as chain link fencing, woven geotextiles, and other similar materials, will be installed no longer than 300 feet, with at least an equal amount of open area prior to another linear installation.

TR-1: Incorporate Public Safety Measures. Fences, barriers, lights, flagging, guards, and signs will be installed as determined appropriate by the public agency having jurisdiction, to give adequate warning to the public of the construction and of any dangerous condition to be encountered as a result thereof.

Santa Clara Valley Habitat Plan Avoidance and Minimization Measures

The SCVHP includes avoidance and minimization measures to protect endangered species and natural resources during activities permitted under the plan; a comprehensive discussion of these measures is presented in Appendix C – Santa Clara Valley Habitat Plan.

1. Minimize the potential impacts on covered species most likely to be affected by changes in hydrology and water quality.

5. Invasive plant species removed during maintenance will be handled and disposed of in such a manner as to prevent further spread of the invasive species.

13. Personnel shall use the appropriate equipment for the job that minimizes disturbance to the channel bed and banks. Appropriately-tired vehicles, either tracked or wheeled, shall be used depending on the situation.

15. If native fish or non-covered, native aquatic vertebrates are present when cofferdams, water bypass structures, and silt barriers are to be installed, a native fish and aquatic vertebrate relocation plan shall be implemented when ecologically appropriate as determined by a qualified biologist to ensure that significant numbers of native fish and aquatic vertebrates are not stranded.

    Prior to the start of work or during the installation of water diversion structures, native aquatic vertebrates shall be captured in the work area and transferred to another reach as determined by a qualified biologist. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Capture and relocation of aquatic vertebrates is not required at individual project sites when site conditions preclude reasonably effective operation of capture gear and equipment, or when the safety biologist conducting the capture may be compromised.

    Listed species not covered by the Habitat Plan will not be relocated without the appropriate permits and authorizations from the correct agencies.

    Relocation of native fish or aquatic vertebrates may not always be ecologically appropriate. Prior to capturing fish and/or vertebrates, the qualified biologist will use factors, including site conditions, system carrying capacity for potential relocated fish, and flow regimes (e.g., if flows are managed) to determine whether a relocation effort is ecologically appropriate. If so, the following factors will be considered when selecting release site(s):

    1. Similar water temperature as capture location;
    2. Ample habitat availability prior to release of capture individuals;
    3. Presence of other same species so that relocation of new individuals will not upset the existing prey/predation function;
    4. Carrying capacity of the relocation location;
    5. Potential for relocated individual to transport disease; and
    6. Low likelihood of fish reentering work site or becoming impinged on exclusion net or screen.

    Proposals to translocate any covered species will be reviewed and approved by the Wildlife Agencies.

20. Conditions for fish passage shall be met as long as the diversion;

    1. Maintains contiguous flows through a low flow channel bed or an artificial open channel,

2. Presents no vertical drops exceeding six (6) inches and follows the natural grade of the site,
3. Maintains flow at the downstream end of the diversion within 1 cubic foot per second (cfs) of flows at the upstream end, and
4. Maintains adequate water depths in the bypass channel to ensure no impediment to upstream or downstream movement of fish is imposed.

30. Vegetation control and removal in channels, on stream banks, and along levees and maintenance roads shall be limited to removal necessary for facility inspection purposes, or to meet regulatory requirements or guidelines.

31.1 When conducting vegetation management, retain as much understory brush and as many trees as feasible, emphasizing shade-producing and bank-stabilizing vegetation. Carry out the activity in such a manner as to minimize impacts to the natural community present and encourage regrowth of the community structure appropriate to the site.

31.2 If riparian vegetation is to be removed with chainsaws, consider using saws currently available that operate with vegetable-based bar oil.

44. Maintenance of natural stream characteristics consistent with the stream section, such as riffle-pool sequences, riparian canopy, sinuosity, floodplain, and natural channel bed, will be incorporated into the Project design.

49. The project or activity must be designed to avoid the removal of native riparian vegetation, where feasible. If the removal native of riparian vegetation is necessary, the amount shall be minimized to the amount necessary to accomplish the required activity and comply with public health and safety directives. Impacts to nonnative vegetation that is determined to be providing unique habitat value (such as shading, foraging habitat, or nesting area) shall be avoided and minimized in the same manner as native vegetation.

50. If levee reconstruction requires the removal of vegetation that provides habitat value to the adjacent stream (e.g., shading, bank stabilization, food sources, etc.), then the project will include replacement of the vegetation/habitat that was removed during reconstruction unless it is determined to be inappropriate to do so by the relevant resource agencies (e.g., CDFW and USFWS).

68. Stabilize stockpiled soil with geotextile or plastic covers. Materials that may entrap reptiles and amphibians, such as mono-filament erosion control materials, shall be avoided.

71. Preserve existing vegetation to the extent possible.

78. In-stream projects occurring while the stream is flowing must use appropriate measures to protect water quality, native fish and covered wildlife species at the Project site and downstream of the Project site.

80. All personnel working within or adjacent to the stream setback (i.e., those people operating ground-disturbing equipment) will be trained by a qualified biologist in these avoidance and minimization measures and the permit obligations of project proponents working under this Plan.

84.1 Appropriate erosion control measures (e.g., fiber rolls, filter fences, vegetative buffer strips) will be used on site to reduce siltation and runoff of contaminants into wetlands, ponds, streams, or riparian vegetation. Erosion control measures will be placed between the outer edge of the buffer and the project site.

84.2 Fiber rolls used for erosion control will be certified as free of noxious weed seed.

84.3 Filter fences and mesh will be of material that will not entrap reptiles and amphibians.

86. Topsoil removed during soil excavation will be preserved and used as topsoil during revegetation when it is necessary to conserve the natural seed bank and aid in revegetation of the site.

89. The potential for traffic impacts on terrestrial animal species will be minimized by adopting traffic speed limits.

90. All trash will be removed from the site daily to avoid attracting potential predators to the site. Personnel will clean the work site before leaving each day by removing all litter and construction-related materials.

91. To prevent the spread of exotic species and reduce the loss of native species, aquatic species will be netted at the drain outlet when draining reservoirs or ponds to surface waters. Captured native fish, native amphibians, and western pond turtles will be relocated if ecologically appropriate. Exotic species will be dispatched.

92. To minimize the spread of pathogens all staff working in aquatic systems (i.e., streams, ponds, and wetlands)—including site monitors, construction crews, and surveyors—will adhere to the most current guidance for equipment decontamination provided by the Wildlife Agencies at the time of activity implementation.

93. When accessing upland areas adjacent to riparian areas or streams, access routes on slopes of greater than 20% should generally be avoided. Subsequent to access, any sloped area should be examined for evidence of instability and either revegetated or filled as necessary to prevent future landslide or erosion.

95. To minimize entrapment of animals on job sites, the project biologist will survey the work area at the close daily activities to identify and remediate any potential areas or conditions that might trap animals. Examples of such include pits, trenches or pipes that animals can fall into or perforated pipes or netting that can cause entanglement.

103. Unless otherwise indicated in an Executive Directive issued by the Habitat Agency, for example a directive to address plant pathogens, (103.1) all disturbed soils will be revegetated with native plants, grasses, seed mixtures, or sterile nonnative species suitable for the altered soil conditions upon completion of construction. (103.2) Local watershed native plants will be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives. (103.3) All disturbed areas that have been compacted shall be de-compacted prior to planting or seeding.

(103.4) Cut-and-fill slopes will be planted with local native or non-invasive plants suitable for the altered soil conditions.

105. Vegetation and debris must be managed in and near culverts and under and near bridges to ensure that entryways remain open and visible to wildlife and that passage through the culvert or bridge remains clear.

107. On streams managed for flood control purposes, when stream reaches require extensive vegetation thinning or removal (e.g., when the channel has been fully occluded by willows or other vegetation), removal will be phased so that some riparian land cover remains and provides some habitat value.

2.E.2 Construction Phases

Sheet Pile Installation

Initially, a series of sheet piles would be installed along the alignment of the proposed levee system, through the middle of the lake using vibratory pile drivers, silent piles, or other similar method. This would allow for the draining of the lake. These activities would occur outside of the normal rainy season, typically between June 1 and October 15. Once the sheet piles are installed, the construction contractor may choose to drain either the western or the eastern portion of the lake first, and conduct the associated activities described below depending on the construction contractor's organization of the work.

Diverting Alamitos Creek

After the sheet piles are installed and prior to initiation of construction in the western portion of the lake, flow from Alamitos Creek channel would be diverted around the construction area to facilitate earthwork operations. Diversion of water around the work site would be accomplished using a cofferdam and pumps (main pump and backup pump) that would divert water out of the work area and into Alamitos Creek downstream from the lake, near the footbridge and Coleman Road overcrossing of Alamitos Creek.

Draining Almaden Lake and Fish Relocation

Draining Almaden Lake would be accomplished outside of salmonid migration period by the installation of sheet piles and the temporary use of portable diesel or electric pumps, which would pump water from the lake into Alamitos Creek downstream of the existing lake. Draining would begin with an initial stage of lake water drawdown.

Once the lake is isolated from the creek and water level is reduced, boat based electrofishing would commence to capture as many fish from the lake as possible. As isolated pools form, additional fish collection could occur using backpack electrofishing, seine, and dip nets to remove fish. Any salmonids captured would be relocated upstream of the lake into Alamitos Creek. If feasible, all other native species would be released either upstream or downstream of the lake. All non-native species would be disposed in a landfill. Prior to draining the western portion Almaden Lake, the inlet and outlet of the lake would be isolated using block nets to avoid any migration of fish into the lake.

Once lake levels are drawn down to the level of the lake bottom, additional groundwater dewatering may be required to maintain water levels below the surface of the lake bottom and enable development of a dry and stable working surface. If required, shallow groundwater wells would be installed, sufficient to draw down groundwater levels to below the surface of the lake bed. Water pumped from these wells would be treated as warranted to remove suspended sediment, and discharged into Alamitos Creek, pending receipt of a discharge permit from the RWQCB.

Portions of the existing lake would similarly be drained as work progresses from one portion of the Project to another. Discharged water would be monitored, consistent with RWQCB permit requirements, on an ongoing basis to ensure sufficient quality for discharge. If required, aerators or similar type devices could be used to circulate and provide oxygen to stagnant waters prior to discharge.

Shallow Sediment Dewatering

Once the lake is drained to the extent possible, it is anticipated that the existing lakebed may be excavated to a minimum depth of 8 inches, and then dried by air to create a stable working surface. However, additional dewatering of shallow lake sediments may be required during construction of the levee foundation and grading of the lake bed. The Project area would be dewatered using sump pumps, well points, and/or installation of temporary drainage management facilities around excavations (Cal Engineering & Geology, 2015).[8] Once captured, dewatered water would be pumped into baker tanks to allow sediments to settle. Following settlement, captured water would be used for on-site dust control and/or be released into the creek in accordance with regulatory requirements.

Working Surface Establishment and Vegetation and Debris Removal

Site preparation would require the establishment of a dry and stable working surface before construction activities begin, as discussed above. Debris, tree roots, and abandoned utilities within the grading area would be cleared and disposed properly. If air drying is not feasible, other methods to dry the work areas would be used, including lime or cement treatment, application of engineered fill material, geogrids, or geotextile fabrics to help stabilize sediments to enable work to proceed. The design and installation of the working surface would be overseen by a geotechnical engineer based on the conditions present at the time of construction, Project constraints, and Project requirements.

All surface vegetation and organic laden soils[9] at a depth determined by a geotechnical engineer at the time of construction would be removed (Cal Engineering & Geology, 2015). ~~All excavated materials would be stockpiled for reuse as fill material in the lake, provided that the soils do not exceed the State threshold for hazardous waste. Excavated soils exceeding the State threshold for hazardous waste would be disposed at an approved hazardous waste~~

[8] Well points are perforated tubes driven into the ground to lower the water table in the surrounding area by pumping (SCVWD, 2015b).

[9] Organic laden soils are defined as soils containing more than 3 percent of organic content by weight.

~~disposal site in Kettleman, CA via truck, or in Utah via rail in accordance with regulatory requirements.~~

Project construction would require the removal of ~~up to~~ approximately 81 to 95 trees in the study area, and an additional 54 trees that could be potentially affected (i.e., root disturbance, trimming, etc.) The affected trees would be predominantly near the western perimeter of the lake, the northern outlet of the lake near Coleman Bridge, and near the southern transition from the creek to the lake along the edge of a City maintenance facility to the intake location on the southern end of Almaden Lake~~, and in the vicinity of Crossview Circle and Crossview Court~~. The trees that would potentially be removed range in size from 4 inches in diameter to 48 inches in diameter (SCVWD, 2019).

Excavation and Fill

Excavation activities for the Project include re-contouring the bed of Almaden Lake and Alamitos Creek, preparing the levee foundation, reconfiguring/cutting the existing west bank of Almaden Lake, reconfiguring the shape of the existing island, trenching for inlet pipes south of Almaden Lake Park, and trenching for a pipeline from the lake to the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds pipeline. All excavation and shoring activities would meet the California Occupational Safety and Health Standards (Cal Engineering & Geology, 2015). Total cut volume is estimated to be approximately ~~194~~ 207,000 cubic yards (SCVWD, 2016b). See Table 2-3~~2~~ for cut volume estimates for each Project component.

Based on soil test results of 4 samples taken at depths ranging from 3 to 10 feet below the top of sediment within the bed of Almaden Lake and 16 soil samples taken at depths ranging from 0 to 5 feet along the shoreline in December 2015, shoreline soils would have no restrictions with respect to on-site reuse or disposal. Based on testing, some lake bottom sediment could be suitable for on-site reuse for re-contouring Almaden Lake or reconfiguring the channel of Alamitos Creek, while other sediment ~~or~~ may require disposal offsite at a non-hazardous Class III landfill consistent with California thresholds for hazardous waste classification. However, some lake bottom soil samples exceeded environmental screening levels (ESLs) established by the San Francisco Bay RWQCB (2013), and non-landfill reuse options may be limited (LA&S, 2014; LA&S, 2015). ~~Therefore, all cut material would be stockpiled in the lake body for reuse as fill material in the lake and creek bed.~~ All fill at the lake bottom would be capped by an imported clay layer about ~~2.5~~ 3 feet thick, sealing sediments contaminated with mercury at the bottom of the lake and preventing its entry into the food chain. Up to 25,000 cubic yards of soils that exceed California thresholds for hazardous waste may be transported to an approved disposal site in Kettleman, California via truck or Utah via rail (SCVWD, 2015e).

TABLE 2-~~3~~2
PROJECT CONSTRUCTION, APPROXIMATE DURATION, CREW SIZE, EQUIPMENT, AND APPROXIMATE CUT AND FILL VOLUMES[A]

Project Element	Sub-Element	Cut Volume (Cubic Yards)	Fill Volume (Cubic Yards)	Estimated Construction Duration[c]	Estimated Construction Crew Size (min)[d]	Estimated Number and Type of Construction Equipment[b]
New Levee & Almaden Lake	Lake Area with ~~2.5~~3-foot Clay Cap	91,639	241,509	103 days	8	2 Compactors, Grader, water truck
	Levee Foundation Area with ~~2.5~~3-foot Clay Cap	120	74,455	123 days	8	2 Compactors, Grader, water truck
	Maintenance Access Road Transition	0	1,000	113 days	8	Dual Axis wet soil mixing rig, dozer, soil plant mixing grout slurry Compactors, Grader, water truck
Alamitos Creek	Channel Area with ~~2.5~~3-foot Clay Cap	1,556	261,283	150 days	8	2 Compactors, Grader, water truck
	Alamitos Creek West Bank Shore Grading	203	9,664	7 days	8	1 Compactor, Grader, water truck,
Islands	Expanded Existing Island	0	10,000	Within Almaden Lake efforts above	Within Almaden Lake efforts above	2 Compactors, Grader, water truck
	New Island	0	40,000	Within Almaden Lake efforts above	Within Almaden Lake efforts above	2 Compactors, Grader, water truck
New Park	Existing Water Area	0	65,493	64 days	5	2 Compactors, Grader, water truck
	Existing Park Land	511	3,072	64 days	5	2 Compactors, Grader, water truck
	New Berm	0	5,100	30 days	8	2 Compactors, Grader, water truck
Transfer Pipeline	From Almaden Valley Pipeline	~~54,086~~67,141	~~50,036~~62,114	80 days	8	Truck loader, excavator, compactor, butt fusion machine, crane
	To ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds Pipeline	45,884	41,174	8~~0~~7 days	8	Truck loader, excavator, compactor, butt fusion machine, crane
Total		~~193,999~~207,054	~~897,686~~814,864	784 days	N/A	N/A

[a] Volumes listed above are approximate and will be refined during final design; however, volumes listed represent the maximum that could be expected based on available information.
[b] Additional equipment, including backhoes, dump trucks, excavators, and front end loaders, could be used at times during construction work phases.
[c] The estimated construction durations listed are the approximate number of working days and are subject to change as the Project designs are refined. The construction durations may overlap depending on the construction contractor's organization of the work.
[d] The construction crew size for each activity represents the minimum number of workers that will be onsite for the activity. The crews for each activity may overlap depending on the construction schedule.

SOURCE: SCVWD, 2016b and SCVWD, 2018a

Re-contouring of the Almaden Lake Bed and Levee and Berm Foundation Construction

Based on a geotechnical investigation conducted at the lake in fall 2014, the lake has a uniform subsurface condition (SCVWD, 2015b). The depth of lake sediment was estimated to range in thickness from 5 to 10 feet above the alluvium layer (SCVWD, 2016b). After completing excavation within the bed of Almaden Lake consistent with determination made by the Project geotechnical engineer at the time of earthwork activities, all holes and depressions below the design grade and within the proposed lake bed area would be cleared and backfilled with engineered fill, and then adequately compacted. The lake area would then be capped with about ~~2.5~~3 feet of clay fill, ~~imported from the Stevens Creek Quarry,~~ which would be placed over the remaining sediments.

Once the soft lake sediments are removed from within the footprint of the new levee, eight inches of exposed alluvial soils would also be removed. Alternatively, in coordination with the Project geotechnical engineer, the contractor may use alternative methods, such as cement lime construction, for building the proposed levee, which would avoid the need to remove underlying soft sediments in that area (SCVWD, 2015b). Sediments within the footprint of the proposed levee would be further reinforced through the construction of in-situ soil cement columns. These columns would be drilled into the subsurface then cemented, in order to increase the bearing capacity of the lake bottom materials, and to help minimize levee subsidence. The depth and diameter of the columns would be determined during the engineering/design phase of the Project. In this manner, the alluvial soil underlying the proposed levees would be adequately reinforced to support the compacted engineered levee fill. The new levee would be constructed with a slope no greater than 2H:1V, and protected from erosion. Erosion protection would consist of an erosion resistant planting scheme, which would be subject to the approval of a qualified landscape architect.

The proposed levee would be constructed of engineered fill in accordance with the District's standard requirements for levee construction and consistent with the California Building Code. The proposed stream bed would be constructed in a similar manner using similar materials. All fill materials would meet the requirements for Levee Fill Material as specified in the District's Levee Safety Technical Guidance Manual (SCVWD, 2002), and would be sourced from the nearby Stevens Creek Quarry, another District project, or another suitable source within the region. Fill volumes are shown in Table 2-3~~2~~. After the construction of the proposed levee, the sheet piles would be removed.

Along the proposed levee, the fill is expected to settle during construction; therefore, an additional layer of fill would be applied to compensate for the anticipated settlement. The thickness of the additional fill would be determined based on the results from a settlement monitoring program to determine the rate of settlement. If settlement occurs beyond the duration of construction activities, site grades would be evaluated at 95 percent consolidation and adjusted, if needed. The frequency of monitoring would be based on the rate that fill material application is needed.

Island Construction and New Park Area Construction

The proposed islands would be constructed using a combination of sediment derived from cut areas of the existing island and existing berm near where Alamitos Creek enters into the existing Lake, and as needed, imported fill material. The reconfigured island and proposed new island would be built up to an elevation of approximately 200 msl, similar to the existing island. Banks of the island would be stabilized, and the upper top two feet of soil would consist of low bulk density soil to support planting.

New park area would be constructed in a manner similar to the proposed islands, and would incorporate on-site fill to the extent available, and imported fill if/as needed. New park areas would be filled to a level consistent with the contours and elevation of existing, adjacent park areas. New open park areas would include bank stabilization as appropriate, and would also include installation of two feet of low bulk density surface soil to support planting.

Pipeline and Outlet Structure Construction

A transfer pipeline from the Almaden Valley Pipeline would be constructed along ~~Los Alamitos Creek~~ McAbee Road to deliver water to Almaden Lake. The pipeline would connect to the Almaden Valley Pipeline approximately 0.5 miles south (and upstream) of Almaden Lake (see Figure 2-4)~~, and be generally aligned between the east side of the creek trail and the west side of Crossview Circle/Court. To avoid Los Alamitos Creek Trail and bordering native vegetation, the proposed pipeline would be located on the west edge of Crossview Circle/Court and would then traverse to the east side of the creek trail at the north end of Crossview Court (Figure 2-4).~~ Where the pipeline would cross under Guadalupe Creek, Almaden Expressway and Alamitos Creek, the District would use trenchless technology (microtunneling or horizontal auger boring). Both methods include bore pits located outside the riparian corridor or roadway. Microtunneling is an effective method of installing pipes beneath bodies of water and environmentally sensitive areas due to the high level of pathway accuracy. The process is done by creating launching and receiving shafts at the start and end locations, lowering the tunnel boring machine into the launching shaft and hydraulically boring to the receiving shaft. Pipes containing slurry water transport the excavated spoils to the surface. Horizontal auger boring is used on relatively homogenous, non-gravel soils. The boring process is done by simultaneously pushing the drill auger, used for parting the soil, and the pipe casing into the ground. Similar to a jackhammer, air is used to create a void where new pipe can be laid. To increase the bore drive length and accuracy, guided boring machine (GBM) systems have been combined with traditional auger boring assemblies. With the inclusion of a GBM system, accurate drives in lengths up to 600 feet have been achieved and continues to be used for short span pipe installation. Use of this construction technique would include control measures that would prevent slurry water from entering waterways. The control measures would include training of construction personnel, methods for preventing accidental release (including maintaining pressure in the borehole and continuous monitoring of slurry volumes at the exit and entry pits), clean-up requirements, and notification requirements.

~~The horizontal directional drilling process would be initiated by boring a small, horizontal hole (pilot hole) under Guadalupe Creek with a steel drill rod. When the bore head and rod emerge on the opposite side of the crossing, a special cutter, called a back reamer, would be attached and pulled back through the pilot hole. The back reamer would bore out the pilot hole so that the pipe could be installed (Plastics Pipe Institute, 2009).~~

At the outfall at the southern end of Almaden Lake, the discharge elevation would be approximately 185 feet. The pipe would be approximately ~~2,590~~3,600 feet long and designed to carry a seasonal flow ranging from 5 cfs to 10 cfs with a diameter of about ~~16~~ 14 inches. The pipeline trench would be approximately 5 feet wide and up to approximately 20 feet deep. The trench would be backfilled using reused excavated fill during Project construction, and off-haul/import of fill for pipeline construction would not be expected. Open-trench construction would generally proceed at a rate of about 100 linear feet per day. Steel plates would be placed over trenches to maintain access to private driveways. Some pipeline installation would require construction in existing roadways and could result in temporary lane closures or detours.

Water from Almaden Lake would be pumped through an approximately ~~2,000 to~~ 2,600-foot long pipeline with an approximate diameter of ~~24~~ 16 inches to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds pipeline (Figure 2-5).[10] The pipeline trench for the outlet pipeline would be approximately 5 feet wide and about 20 feet deep. The trench would be backfilled using reused excavated fill during Project construction, and off-haul/import of fill for pipeline construction would not be expected.

Where the pipeline would cross under Coleman Road, the City of San José property at the northeast corner of Almaden Expressway and Coleman Road, and Guadalupe Creek, the District would use trenchless technology (described above) ~~horizontal directional drilling~~ to install the pipeline ~~beneath the creek~~.

Pump Station Construction

The ~~underwater pump located in Almaden Lake (Pump Station A, Figure 2-5) or above-ground~~ pump station located ~~on the northwest corner of~~ at the north edge of Almaden Lake Park ~~parking lot (Pump Station B,~~ Figure 2-5) would be installed.

Native Revegetation and Landscaping

Revegetation would be initiated after the completion of construction and associated clean-up activities as discussed above (Section 2.D.1 – Project Components, Native Vegetation).

In total, the Project would install up to eight acres of locally sourced, native vegetation. In addition, the two acre area near the beach that would be converted to open park area would be planted in coordination with the City of San José Parks Department. Finally, pedestrian

[10] ~~The pipeline alignment options are described under Section 2.D.1, Project Components, Outlet to Los Alamitos Percolation Pond.~~

paths and maintenance access ramps would be installed, and picnic benches and boat launch facilities would be relocated.

Restoration of Creek Flows and Filling the Lake

Once creek, west bank, and new park area construction and planting are complete, flows would be released back to Alamitos Creek. This would allow winter storm flows to pass through the construction area without damaging or substantially interfering with other construction activities.

Almaden Lake would be refilled when creek construction, lake bottom recontouring, island grading, planting, and pipeline construction are complete.

Installation of SolarBees

Following the lake construction, the existing SolarBees would be reinstalled to continue water circulation improvements in the lake. In addition to the existing four SolarBees currently being used, the Project would install three additional SolarBee devices to further improve water circulation. Overall, a total of seven SolarBee devices would operate in the lake water body.

2.E.3 Summary of Construction Equipment/Crews/Duration

The following is a summary of the construction equipment that could be used during construction of the Project:

- Backhoes
- Compactors
- Dozers
- Crane
- Dump trucks
- Excavators
- Front end loaders
- Floating barge
- Motor graders
- Loader scrapers
- Water trucks
- Wet Soil mixing rig
- Vibratory pile driver

The type of construction activity would dictate the number of workers required and the duration of activities. Based upon Project phasing, 48 workers would be the maximum number of daily construction workers at the Project site, assuming that some construction workers would work in multiple construction phases performing various construction tasks.

Construction activities are anticipated to span from approximately June 2022 ~~2021~~ to December 2024 ~~2023~~. Table 2-3~~2~~ summarizes each construction activity, as well as estimated timeframes, crew size, and equipment requirements for the Project, by activity. Construction activities would typically occur between the hours of 7 am and 7 pm, Monday through Friday. With written approval from the City of San José, construction activities could also occur on Saturdays from 8 am to 5 pm. However, no work would occur on Sundays and holidays, except under special or emergency cases approved by the District and City.

Should the District determine, during Project design and construction planning, that obtainment of sufficient clean fill would be difficult during the defined construction period above, the District would consider reordering the progression of construction activities such that following installation of sheet piles to section of the eastern portion of the lake and dewatering of that area; the area would be used to stockpile fill material until sufficient material is available to begin the remaining construction activities. Alamitos Creek would not be diverted and would comingle with the western portion of the lake until the remaining construction activities commence. It is expected that this approach could extend the construction period up to approximately 18 months.

Construction and Demolition Waste

As noted in the discussion of lake excavation and fill, up to 25,000 cubic yards of soils that exceed California thresholds for hazardous waste may be transported to an approved disposal site in Kettleman, California or Utah (SCVWD, 2015e). In addition, the Project would generate limited construction and demolition general waste. Over the construction period, it is anticipated that area landfill(s) would receive up to 500 cubic yards of general construction and demolition materials, which would include primarily concrete.

Timing of Construction

Based on the acquisition time for permits and available funding sources, the proposed construction activities could start as early as summer 2022 ~~2021~~, with an approximate duration of 30 months. The Project team anticipates that construction of the levee, lake reconfiguration, and island related construction would occur during the first year of construction. Construction of the creek, west bank park area, and outlet structure, and revegetation would occur in the second year. Pipeline construction could occur in either the first or second year of construction. The actual staging of construction would be determined in coordination with the contractor selected to build the project.

2.E.4 Staging Areas and Access

Construction staging areas include Almaden Lake, the southwestern lawn area of Almaden Lake Park, ~~the vacant property owned by the City of San José also known as the Sycamore Terrace property,~~ and the District's Winfield Warehouse (Figure 2-2). The bed of Almaden Lake would contain construction access and staging areas. As construction activities progress, lakebed staging areas would be relocated within the bed of the lake as different areas of the Project site need to be accessed. Outside of the lake bed, other potential staging areas include the southwestern lawn area of Almaden Lake Park~~, the Sycamore Terrace property located at the northeast corner of Almaden Expressway and Coleman Road,~~ and paved areas (parking, storage areas) at the District's Winfield Warehouse, located to the north of Coleman Road, along Winfield Boulevard. ~~Use of the Sycamore Terrace property for staging would be coordinated with the City of San José.~~

Construction ingress and egress would be from two established Almaden Lake Park entrances and exits on Winfield Boulevard and Almaden Expressway (Figure 2-2), and would be

coordinated with the City of San José. The construction contractor would use stabilized construction roads to access the Almaden Lake Park entrances as needed. Additional access to the site would be from immediately downstream of the Coleman Road Bridge at the Guadalupe River East Bank Trail by the Santa Clara Valley Transportation Authority Almaden Light Rail Station (Figure 2-2). This access point could serve as a construction ingress and egress location, as well as a haul route location for fill material. Worker and equipment parking would be provided along Winfield Boulevard and on adjacent streets to the Park. Proposed haul routes would include Coleman Road, Winfield Boulevard, Almaden Expressway, Santa Teresa Boulevard, and California State Route 87 (Guadalupe Freeway).[11]

Temporary construction fencing would be installed along the perimeter of the work area in order to restrict access to the construction area. Construction fencing would surround the anticipated disturbance area, from the southern end of Alamitos Creek, running south along the proposed western bank of Alamitos Creek, south to the construction access point at Winfield Boulevard, and around the remaining lake areas.

2.E.5 Stormwater Management

Project construction would be managed so as to maintain capacity to manage storm flows in the event that a major storm event were to occur during the construction period. Following draining of the lake, the construction contractor would be responsible for implementing all BMPs for stormwater pollution prevention and control applicable to Project construction and stormwater flows originating from the Project site in compliance with the California Stormwater Construction General Permit and applicable Project discharge permits. The stormwater BMPs would be applied in accordance with the most up to date version of California Stormwater Quality Association's "Construction Best Management Practice Handbook."

2.F Maintenance

2.F.1 Long-Term Monitoring and Maintenance Activities

Existing and ongoing maintenance activities at Almaden Lake include island vegetation management and water quality sampling, testing, and annual reporting. These maintenance activities would continue under the proposed Project. Additional maintenance activities would also be required to support the proposed features. The City of San José would be responsible for maintenance of the new open park area, while anticipated maintenance activities for the District would include embankment and levee inspection and repair, levee settlement adjustment, restored vegetation maintenance and management along the restored creek and islands, lake water quality monitoring, and maintenance road grading and upkeep. Most activities would be implemented regularly to maintain the Project facilities at design conditions, as described below.

[11] No commercial vehicles are allowed on California State Route 85 (SCVWD, 2015b).

Routinely performed vegetation management activities would include:

- *Levee and Berm*: The District would prevent vegetation growth along the top of levee maintenance roads and the top of the berm via pre and post emergent herbicide application and hand weed abatement, tree removal, and mowing along levee embankments for fuel load management.

- *Natural and Low Flow Channel:* The District would monitor natural and low flow channels for hazardous tree conditions, channel blockages, and other conditions that would impede flow or create local drainage problems.

- *Restored Native Vegetation:* The District would monitor Project planting areas (along the creek, floodplain, lake, and islands) to determine the need for any maintenance or remedial actions, such as replacement plantings, substitute species, weeding, and/or non-native plant treatment. Monitoring and maintenance of the new park area would be conducted in coordination with the City of San José Parks Department.

  Ongoing management of established lake vegetation would include mowing, pruning, and weeding. Maintenance would occur annually during the summer months.

  Ongoing management of established island vegetation would include hand weed abatement and herbicide activities to control invasive plants. Inspection and maintenance of island vegetation would be consistent with standard District vegetation maintenance practices.

  In limited cases, herbicides or algaecides may be used for vegetation management, consistent with the District's Best Management Practices Handbook BMPs (SCVWD, 2014a) and Stream Maintenance Program Manual BMPs (SCVWD, 2014b).

Structural maintenance activities would include:

- *Levee and Berm:* The District would monitor levee and berm top and slopes for erosion damage, and would repair as needed. In addition, the levee and berm top would be monitored annually for settlement. If the measured elevation differs from the design grade elevation by more than one foot, the District would take corrective action.

- *Road and Trail Maintenance:* A~~n~~ permeable aggregate road base would be applied to the top of the new levee and berm that would be self-maintained. Stormwater running off the levee maintenance road would be directed to vegetated areas adjacent to the road to promote infiltration and remove sediment and other pollutants from the runoff before it enters the creek and lake. The trails located within the new park area would be maintained by the City.

- *Creek Channel*: Consistent with the District's Stream Maintenance Program (SMP), the District would repair any erosion along the banks of the proposed Alamitos Creek channel. In addition, the District would monitor sediment deposition in the creek channel, and would conduct maintenance on any erosion damage, structural damage, or sediment depths greater than one foot on average outside of design conditions. The Project is designed to carry sediment through the Project area and is expected to require minimal maintenance. Sediment removal or erosion repair, if needed, could require a variety of heavy equipment, as well as a temporary cofferdam if flows must bypass the maintenance site.

The District anticipates sediment would pass through the Project area, which is currently trapped in the lake, and continue to the confluence of Alamitos Creek and Guadalupe Creek. Here periodic sediment removal ~~of about 5,000 cubic yards from the proposed Alamitos Creek section~~ takes place as part of the SMP. Sediment removal would continue in the future with increased volumes ~~approximately every 10 years (SCVWD, 2015b)~~. These maintenance activities would be carried out consistent with the SMP as part of the Project. The Alamitos Creek channel maintenance activities would be incorporated in the next SMP update, after which creek channel maintenance would be considered to be part of the SMP. Excavated sediment would be reused on site where feasible, or would be disposed of at a landfill or other suitable site, in accordance with applicable disposal requirements.

The City would visually inspect exposed and accessible creek channel walls on a monthly basis and remove any graffiti.

- *Lake:* Almaden Lake water quality would continue to be monitored monthly to bi-monthly by District staff for mercury and methylmercury concentrations in compliance with the Guadalupe River Watershed TMDL. The District would continue to display public education signage discouraging the release of non-native fish into the Lake. Other maintenance activities associated with Almaden Lake would include maintenance of the SolarBees. The City would continue to collect litter and perform graffiti abatement around the perimeter of the lake.

Vegetation management, trash and debris removal, and graffiti abatement within the Park, including the new Park elements, would continue to be the responsibility of the City.

2.G Intended Uses of the EIR and Required Permits and Approvals

The information contained in the EIR and the administrative record will be reviewed and considered by the District Board of Directors prior to the ultimate decision to approve, disapprove, or modify the Project.

Agencies expected to use this EIR in their decision making for permits required for implementation of the Project are listed in Table 2-~~43~~ along with the likely permits and approvals necessary. This EIR presents environmental reviews that will support these agencies' permitting and approval processes.

TABLE 2-~~43~~
ANTICIPATED PERMITS AND APPROVALS

Anticipated Permit or Approval	Agency
Federal	
Clean Water Act Section 404 permit	U.S. Army Corps of Engineers
Endangered Species Act Section 7 Consultation	National Marine Fisheries Service (NMFS)
Endangered Species Act Section 7 Consultation	U.S. Fish and Wildlife Service (USFWS)
State	
Section 1602 Lake and Streambed Alteration Agreement California Endangered Species Act authorization	California Department of Fish and Wildlife (CDFW)
Transportation Permit	California Department of Transportation (Caltrans)
Clean Water Act Section 401 Water Quality Certification of Section 404 Permit Porter-Cologne Water Quality Control Act Waste Discharge Requirements Construction General Permit coverage	San Francisco Bay Regional Water Quality Control Board
Local	
Project Approval	Santa Clara Valley Water District
Permanent Easement and Encroachment Permit, Approval of Traffic Control Plans	City of San José
Santa Clara Valley Habitat Conservation Plan & Natural Communities Conservation Plan (HCP/NCCP) Compliance	Santa Clara Valley Habitat Agency
Grading Permit, approval of traffic control plans	County of Santa Clara

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CHAPTER 3
Environmental Setting, Impacts, and Mitigation Measures

Introduction to Analysis

Scope of the EIR

Chapter 3, Environmental Setting, Impacts, and Mitigation Measures, presents the environmental and regulator setting, impacts, and mitigation measures for the technical issue areas applicable to the Almaden Lake Improvement Project (Project). The environmental analysis provided is organized according to applicable California Environmental Quality Act (CEQA) resource area. Sections 3.A through 3.P present the following resource areas addressed in this Environmental Impact Report (EIR):

- 3.A Aesthetics
- 3.B Agriculture and Forest Resources
- 3.C Air Quality
- 3.D Biological Resources
- 3.E Fisheries Resources
- 3.F Cultural Resources and Tribal Cultural Resources
- 3.G Energy
- 3.H Geology and Soils
- 3.I Greenhouse Gas Emissions
- 3.J Hazards and Hazardous Materials
- 3.K Hydrology and Water Quality
- 3.L Noise
- 3.M Public Services
- 3.N Recreation
- 3.O Transportation
- 3.P Utilities and Service Systems

Section Format

Each section contains, as relevant: (1) identification of the technical issue areas being evaluated in the section; (2) environmental and regulatory setting; (3) standards of significance; (4) method of analysis; (5) Santa Clara Valley Water District (District) best management practices, as applicable (6) assessment of Project impacts; and (7) recommended mitigation measures that reduce or avoid significant impacts, as applicable.

The environmental and regulatory setting discussion presented in each of the resource area sections summarizes the conditions that exist prior to implementation of the Project, and provides a point of reference (or baseline) for assessing the environmental impacts of the proposed Project. Each impact and mitigation measure discussion includes an impact

statement (in bold text), an explanation of the impact (as it relates to the Project), an analysis of the significance of the impact, identification of relevant mitigation measures if applicable, and an evaluation of whether the identified mitigation measures would reduce the magnitude of identified impacts. Each impact statement is assigned a number based on the section and the order they appear (for example, 3.A-1, 3.A-2, etc.). Mitigation measures for each impact are numbered in order (for example 3.A-1, 3.A-2, etc.).

Significance Determinations

The significance criteria used in this EIR are based on the CEQA Guidelines Appendix G, with some modifications. The significance criteria used to analyze each environmental resource topic are presented in each section of Chapter 3 before the discussion of impacts. The categories used to designate impact significance are described below:

- No Impact (NI). A project is considered to have no impact if there is no potential for impacts, or if the environmental resource does not exist within the project area or the area of potential effect. For example, there would be no impacts related to wastewater disposal if the Project would not involve the production of wastewater.
- Less than Significant (LS). This determination applies if there is a potential for some limited impact, but not a substantial adverse effect that qualifies under the significance criteria as a significant impact. No mitigation is required for impacts determined to be LS.
- Less than Significant with Mitigation (LSM). This determination applies to impacts that either could be or are significant and likely to occur, but for which feasible mitigation is available to reduce the impacts to a less than significant level. Some of the determinations are conservative in that there is no known information suggesting a definite significant impact, but for the purpose of this EIR, those impacts are conservatively treated as significant and mitigation measures are proposed to reduce those impacts to less than significant.
- Significant, Unavoidable (SU). This determination applies to impacts that either could be or are significant but for which no feasible mitigation has been identified reduce the impacts to a less than significant level. There might be some mitigation available to lessen the impact, but the residual effect remains significant and therefore the impact is considered unavoidable.

In determining the significance of a project impact, the analysis first describes the nature, frequency, magnitude, and/or severity of a potential effect and then determines whether it is significant, or less than significant, or that no impact would occur, based on the appropriate significance criteria.

The District developed, and regularly updates, the Santa Clara Valley Water District Best Management Practices Handbook (SCVWD, 2014) which provides a comprehensive list of District best management practices (BMPs) that are consistently applied to design, development, and implementation of District projects with the purpose of minimizing or avoiding adverse environmental effects. The individual BMPs are organized into environmental categories consistent with the CEQA Environmental Checklist Form (CEQA Guidelines, Appendix G). BMPs that apply to specific environmental impacts will be included

in the Project, and are incorporated into the impact analyses prior to determining significance level and the need for mitigation.

Within each section in this chapter, a summary table is provided at the beginning of the impact discussion to summarize the potential impacts and indicate the level of impact significance. A summary table is also provided at the beginning of the impact discussion to summarize applicable mitigation measures.

Effects not Found to be Significant

According to CEQA Guidelines Section 15128, effects not found to be significant do not need to be discussed in detail in an EIR. Where one or more significance criteria were found to be not applicable or to have no impact, they are discussed in the approach to analysis section for each resource topic. However, in the course of this evaluation, the District determined that the Project would have no impact on some resource sections in their entirety, including land use and planning, mineral resources, population and housing, ~~tribal cultural resources,~~ and wildfire. These resource topics and explanations for why there would be no impacts are discussed below.

Land Use and Planning

The Project would not physically divide an established community or cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. The proposed Project construction activities would not cause an environmental impact due to a conflict with the applicable principles and policies in the *Envision San José 2040 General Plan*. Project construction would not result in environmental impacts due to land use conflicts with the principles and policies in the General Plan or with any other land use plan, policy, or regulation related to environmental effects. The Project would not change existing land uses to alternate land uses, and therefore would not require or result in a change in land use or zoning designation. Therefore, no impact would occur with respect to land use conflicts that could result in environmental impacts.

In general, future use of the Project area would be similar to current uses and would be located within recreation areas and not within an established community. The Project would include the continuation of existing and ongoing maintenance activities at Almaden Lake as well as new activities such as routine vegetation management and maintenance road grading and upkeep. These activities would not cause an environmental impact due to a land use conflict with the principles and policies in the *Envision San José 2040 General Plan*. Project operations would not result in land use conflicts with the principles and policies in the General Plan or with any other land use plan, policy, or regulation related to environmental effects. Project operations would not alter existing land use within or surrounding the Project site, and therefore would not conflict with or require updating of existing zoning or land use designations applicable to the Project area or its vicinity. Therefore, no impact would occur related to land use conflicts that would result in environmental impacts.

Mineral Resources

The Project would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state or result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. In spite of its historic use as a quarry, the Project would not be located within a significant mineral, oil, or gas resources area (San José, 2011; DOGGR, 2016). Furthermore, local land use plans do not indicate presence of locally important mineral resources on the Project site. Therefore, the Project would not result in the loss of availability of a known mineral resource, nor would result in the loss of a locally-important mineral resource recovery site. The Project would have no impact related to mineral resources.

Population and Housing

The project would not induce substantial unplanned population growth in the area, either directly (for example by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure) or displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

During the Project construction period, up to 48 construction workers would be working at the Project site at any given time, depending on the phase of construction and the construction activities underway (see Table 2-2 in Chapter 2, Project Description). It is expected that construction workers would be supplied from the San Francisco Bay Area employment pool. While it is possible that some workers might temporarily relocate from other areas, the small increase potentially attributable to Project construction would not result in a substantial increase in the local population and would not create an increase in demand for services in the area.

The Project would not include new homes or businesses, nor would it permanently increase the capacity of the recreational facilities and opportunities at Almaden Lake Park (Park) in a way that would induce unplanned population growth. The Project is not intended to increase population growth over current trends. Additionally, the pipeline connection between Almaden Valley Pipeline, Almaden Lake, and the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds would be intended to facilitate the handling of an existing water supply, and would not be anticipated to cause a condition that would induce population growth. Therefore, the Project would have no impact as a result of unplanned population growth.

The construction and future use of the Project components would not require the displacement of existing people or housing. Construction would occur within the existing boundaries of the Park and proposed pipeline corridors connecting Almaden Lake to Almaden Valley Pipeline (upstream) and ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds (downstream) with staging occurring within the Park and on existing District property immediately to the north on Winfield Boulevard. Installation and operation of the pipeline connection between Almaden Valley Pipeline, Almaden Lake, and ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds would be within existing streets and

trails, within the Park, or on District property. It would not encroach upon existing or future populated areas or residential developments. Therefore, the Project would have no impact from displacing existing people or housing.

Wildfire

The Project is not located in or near state responsibility areas or lands classified as very high fire hazard severity zones. Both the State of California and Santa Clara County map Fire Hazard Severity Zones (FHSZs) within the County. The FHSZs are based on an evaluation of fire history, existing and potential fuel, flame length, blowing embers, terrain, weather, and the likelihood of buildings igniting (California Department of Forestry and Fire Protection [CalFire], 2016). According to CalFire, the Project site is located in an area designated as a non-very high fire hazard severity zone; and no areas of very high fire hazard severity are near the Project site (CalFire, 2008). Further, the Project site is not in an area of slope, prevailing winds, or areas subject to exacerbated wildfire risks or post-fire slope instability. Thus, the Project would have no impact associated with potential wildfire effects on areas of very high fire hazard severity. Further, the District BMPs include Fire Prevention measures (HM-12) that would reduce the potential for any catastrophic fire to occur as a result of Project construction and operational activities.

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3.A Aesthetics

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to aesthetics and visual resources, and includes an analysis of impacts to those resources from the Project. For the purpose of this assessment, visual resources are generally defined as the natural and built features of the landscape that contribute to the public's experience and appreciation of the environment. If needed, District best management practices (BMPs) and mitigation measures to avoid or reduce significant impacts are also identified.

3.A.1 Environmental Setting

To assist the reader in understanding the geographic context at and around the Project site, the following distinctions are offered:

- The Guadalupe River is formed by the confluence of Alamitos Creek from the south (i.e., Almaden Lake) and Guadalupe Creek from the west. This confluence is immediately north of Coleman Road.
- The southern terminus of the Guadalupe River Trail is at the intersection of Almaden Expressway and Coleman Road, opposite the northwest corner of Almaden Lake Park. From this point, the trail travels north away from the Park along the east side of the Guadalupe River.
- The eastern terminus of the Guadalupe Creek Trail is approximately 0.25-mile north of Almaden Lake Park on Almaden Expressway at Chris Hotts Park. This trail travels west away from the general vicinity of the Park along the north side of Guadalupe Creek.
- The northern terminus of the Almaden Lake Trail is at its intersection with the Guadalupe River Trail immediately north of Coleman Road. From the north shore of Almaden Lake, this trail travels north under the Coleman Road and Guadalupe River Trail bridges to this intersection. Within the Park (i.e., south of Coleman Road), the trail encompasses Almaden Lake. South of the Almaden Lake Park, the Almaden Lake Trail is linked to the Los Alamitos Creek Trail.

Regional Setting

The Project is situated in the southern San Francisco Bay area in central Santa Clara County. The site lies within the southern portion of the City of San José, largely characterized by residential neighborhoods, parks and trails, a golf course, a school with athletic fields, and public utility water retention ponds. The sprawling City of San José itself is the major urban center in the Santa Clara Valley.

The Santa Clara Valley is situated between the Santa Cruz Mountains to the west and the Diablo Range to the east. Views of the Diablo Range, situated approximately 6 miles east, are available from locations on the west shore of Almaden Lake. Nearby peaks of the Santa Cruz Mountains, located approximately 2 miles west, appear prominently in views from the north and east shores of the lake. Lands to the north of the Project are fairly flat; however, several smaller hills and knolls rise to the south and west of the lake, including the Santa

Teresa Hills. With the exception of a knoll located in its southwest portion, topography within the 65-acre Almaden Lake Park is relatively flat. Water levels in Almaden Lake are generally 190 feet above sea level, approximately 10 to 15 feet below the surrounding roads and trails.

Almaden Lake Park is bounded by public roadways, including Coleman Road to the north, Winfield Boulevard to the east and south, and Almaden Expressway, a Santa Clara County scenic roadway, to the west. North of Coleman Road, the Almaden Lake trail links to the Guadalupe River Trail, which continues north along the Guadalupe River. The Almaden Lake Trail enters the Park at the Coleman Road bridge and continues along the north shoreline to encompass the lake.

Figure 3.A-1 shows the Park and surrounding area and points from which representative photos were taken. Photos 1 through 10 in Figure 3.A-2 show views in the area surrounding the Park.

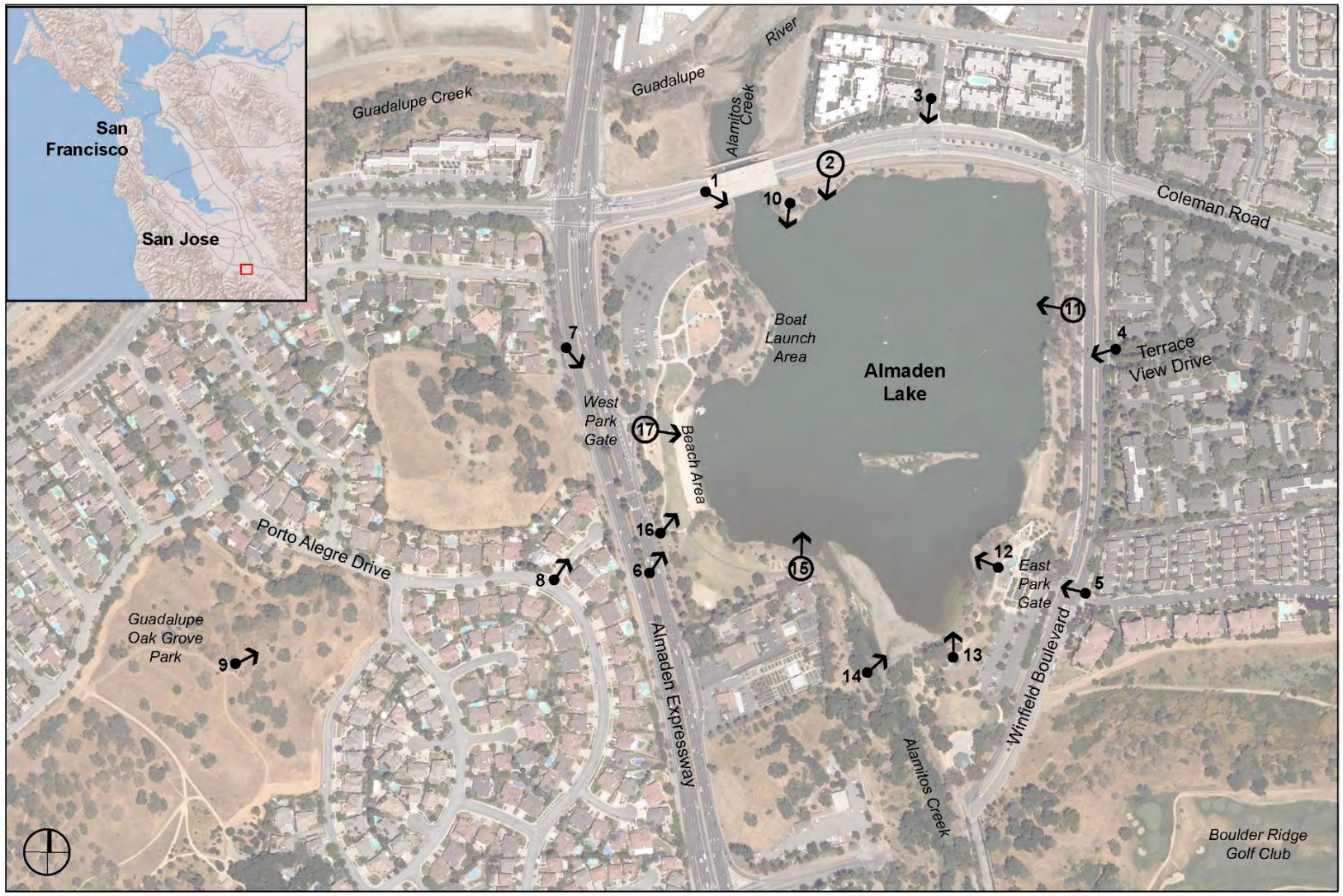
Project Site

The Project area is an urban landscape comprised of a mixture of land uses that include public open space, private recreation areas, and residential neighborhoods. Along Coleman Road and Winfield Boulevard, multifamily residential developments face the lake, and an apartment building with residences for seniors lies at the northwest corner of Coleman Road and Almaden Expressway. To the west, across Almaden Expressway, single-family residences are setback and separated from the roadway by a sound wall. To the south, single-family residential neighborhoods are located on either side of the Los Alamitos Creek Trail corridor, and the 300-acre Boulder Ridge Golf Club is located southeast of the Project area. Small scale commercial developments occupy an area to the southwest, adjacent to Almaden Lake Park. Located approximately 0.25 mile to the west, Guadalupe Oak Grove Park is an approximately 62-acre City park with recreation facilities and open space, encompassing two small hills from which the Project site may be viewed (Photo 9).

The visual character within Almaden Lake Park includes naturalistic landscaped areas near the water, as well as developed recreation facilities. Photos 1 through 9 of Figure 3.A-2 present viewpoints from various locations outside of Almaden Lake Park while Photos 10 through 17 present views of various view points within the Park.

The paved multi-use trails, which comprise the Almaden Lake Trail, surround the lake and connect to the Los Alamitos Creek Trail to the south and Guadalupe River Trail to the north. Two parking areas, one on the east and one on the west side of the lake, are the focus for more developed activities. The western area includes a beach formerly used for swimming, bathrooms, a snack bar, a boat launch area, a tot lot, a lifeguard building, and a volleyball court. The eastern area includes restrooms, an amphitheater, tot lot, and a bocce ball court. Developed picnic areas, many including shade trellises, can be found throughout the Park.

Vegetation within the Park is comprised of a variety of mature trees planted in naturalistic groupings, lawn areas, and riparian vegetation along the edge of Alamitos Creek at the north and south ends of the lake. To the east and west of the Park, mature trees line public roadways and, to the north, street trees have been recently planted along Coleman Road.



SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-1
Project and Photograph Viewpoint Locations

1

Eastbound on the Coleman Road bridge over Alamitos Creek looking southeast.
Proposed levee, new island, and expanded island would be seen beyond existing guard rail.



2

*Coleman Road looking southwest from east of Alamitos Creek.
Restored Alamitos Creek channel would be visible beyond the northern end of the proposed levee. Tree in right foreground could be removed, and the proposed expanded park area would be visible, on the far bank, in the distance.



3

Almaden Lake Village at Coleman Road looking south.
Almaden Lake is partially visible beyond park perimeter fence.



***Simulation viewpoint**
Refer to Figure 3.A-1 for viewpoint locations

SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-2
Site Views

4

Terrace View Drive at Winfield Boulevard looking west.
Almaden Lake is barely visible beyond park perimeter fence.



5

Winfield Boulevard looking west towards east entrance of Almaden Lake Park.
Almaden Lake is not visible due to vegetation screening.



SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-2
Site Views

6



Northbound Almaden Expressway looking northeast.
Proposed expanded park area would be visible near the center of this view, with the proposed levee beyond.

7



Southbound Almaden Expressway near the west entrance of Almaden Lake Park looking southeast.
Almaden Lake is barely visible beyond roadway signs and park perimeter fence.

Refer to Figure 3.A-1 for viewpoint locations

SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-2
Site Views

8

Porto Alegre Court
looking east.
Almaden Lake is screened by a wall and vegetation and therefore is not visible.



9

Guadalupe Oak Grove
Park looking east.
Almaden Lake is visible near the center of this view, although partially screened by intervening vegetation.



Refer to Figure 3.A-1 for viewpoint locations

SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-2
Site Views

10



Almaden Lake Trail near pedestrian entrance gate from Guadalupe River Trail link looking south.
Restored Alamitos Creek channel would be seen near the right side of this view, and on the left a portion of the proposed levee. The existing boat launch area, including the blue building on the right would be removed.

11



*Almaden Lake Trail from the east side of the lake looking northwest toward Coleman Road.
The northern end of the proposed levee would be near the center of this view, on the right side of the existing Coleman Road bridge. The new island would also be visible.

***Simulation viewpoint**
Refer to Figure 3.A-1 for viewpoint locations

SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-2
Site Views

12



Almaden Lake Trail near the amphitheater on the southeast side of the lake looking west toward the beach area.
View from near new potential boat launch area at the southern end of the proposed levee; proposed expanded park area would also be visible in the distance, beyond the levee.

13



Looking north, toward Coleman Road, from the South Point Picnic Area.
The new levee with new maintenance road and trail would be prominent in the foreground. The expanded island would be seen in the background of the view and portions of the new island may be visible beyond, toward the north shoreline.

Refer to Figure 3.A-1 for viewpoint locations

SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-2
Site Views

14

Near Trail on southwest side of lake looking northeast. *Portions of the restored Alamitos Creek channel would appear in the foreground and southern end of the proposed levee, including the new potential boat launch area, would be on the right, along the far shore.*



15

*Almaden Lake Trail on southwest side of lake looking north toward Coleman Road Bridge.
The proposed expanded park area would appear on left and the restored Alamitos Creek channel would be seen on the right. The existing boat launch area, including the blue building, partially screened by vegetation, on the right would be removed.



16

Ohlone Picnic area on west side of lake looking northeast. Proposed *expanded park area would increase the size of the lawn in the foreground. The existing boat launch area, seen near the center of the view, would be removed and proposed levee would be visible beyond.*



***Simulation viewpoint**
Refer to Figure 3.A-1 for viewpoint locations

SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-2
Site Views

17



*Lawn area near West Entrance Station looking east. *The proposed expanded park area would be seen in the foreground, and the proposed levee would be visible beyond.*

***Simulation viewpoint**
Refer to Figure 3.A-1 for viewpoint locations

SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-2
Site Views

As noted above, Figure 3.A-1 shows the Park, the surrounding area, and points from which representative photos were taken. These photos are presented in Figure 3.A-2. Photos 1 and 2 present existing views from Coleman Road. Street tree and median planting along Coleman Road are relatively new and, therefore, provide limited screening of views toward the Park at this time. From the sidewalk on the south side of Coleman Road, eastbound lanes, and Almaden Lake Trail, open views across the lake are available, while from locations further from the Park edge, including from the Almaden Lake Village residential area to the east (Photo 3), views are substantially screened by vegetation and topography. The views from the north include the Santa Cruz Mountains and the Santa Teresa Hills in the background.

Photos 4 and 5, taken from or near Winfield Boulevard represent residential and roadway views from east of the Park. As seen from this area, mature trees along the road and in the Park generally screen views of the lake and opposite shore. Photo 4 shows that the lake may be visible from some locations along Winfield Boulevard, including nearby residential areas, although the views are partially screened by street and park trees and the Park's perimeter fence. Photo 5, at the east Park entrance, shows that a combination of vegetation and Park structures screen views of the water.

Photos 6 and 7 present views from Almaden Expressway. The Park and lake are evident in Photo 6 from the northbound lanes of the expressway. Photo 7 is a southbound view from the expressway along the west side of the Park. While the Park's fence and some of the grounds are visible from the southbound direction, they are not clearly discernable through the intervening median vegetation. The posted speed limit on this section of Almaden Expressway is 50 miles per hour (mph), which is a determining factor that acts to reduce viewing opportunities.

From the residential streets located west of Almaden Expressway, a sound wall along the west side of the roadway screens most ground-level views of the Park and lake. Photo 8 is a view from Porto Alegre Court, a cul-de-sac in this single-family-home residential area. The photo demonstrates that the sound wall and mature vegetation block views toward the Park and the lake from this location.

Photo 9 in Figure 3.A-2 is a hilltop view from Guadalupe Oak Grove Park, located approximately 0.25 mile west of the Project site. Although the lake is not visible from much of the Park, a steep dirt trail leads to an elevated viewpoint providing panoramic views of the Santa Clara Valley, the Diablo Range, and the Santa Cruz Mountains. The view includes a portion of Almaden Lake in the middle ground, partially screened by intervening trees.

The area near Almaden Expressway north of the Project site includes the District's main office/maintenance facility, the ~~Los~~Alamitos Percolation Pond, and the Guadalupe River corridor. This corridor includes the river, its levees, a maintenance road on the west levee, and the Guadalupe River Trail on the east levee. A single-family residential neighborhood is located to the west of Almaden Expressway, with large-scale commercial development to the north and east of the District property along Blossom Hill Road and Winfield Boulevard, respectively. Additionally, the Santa Clara Valley Transportation Authority (VTA) Almaden light rail transit (LRT) station and parking is located immediately east of the percolation pond and river.

The Project's staging area would be located at the District's Winfield Warehouse. In close proximity to the Park, this facility is located approximately 0.2-mile north of the north edge of the Park on the west side of Winfield Boulevard. It is surrounded by multi-family and single-family neighborhoods to the south and east, commercial uses to the north, and the VTA Almaden LRT station to the west. There are publicly-accessible views of this facility from the east, south, and west. Slatted security fencing landscaped with a variety of trees, ivy, and shrubbery faces Winfield Boulevard and residences to the east. A textured concrete wall landscaped with ivy and shrubbery faces the Coleman Road VTA station access and multi-family residences to the south. To the west, the larger warehouse building abuts to the property and is visible from the VTA Almaden LRT station. The remainder of the west side of the facility, which is lined with slatted chain link fencing, is visible from the Guadalupe River Trail. Structures on the parcel north of the facility block any publicly-accessible views from that vantage point.

Daytime sources of glare in the vicinity of the Project site include reflections off light-colored surfaces, windows, vehicles, and the lake surface. The primary sources of night-time light and glare in the vicinity include street lighting, vehicular head lights, security lighting, and external lighting in residential areas. Permanent lighting sources on the Project site include parking lot and security lighting.

3.A.2 Regulatory Setting

The Project lies within the City of San José in Santa Clara County. Applicable policies for these two jurisdictions, as well as the state of California, are presented below as they identify designated scenic resources in the Project area.

Federal Regulations

There are no federal plans, policies, regulations, or laws related to aesthetics or visual resources applicable to this Project.

State Regulations

California Scenic Highway Program

The California's Scenic Highways Program, described in the State Streets and Highways Code, was established by the Legislature in 1963 to preserve and enhance California's natural beauty. The State Scenic Highway System includes highways that either are eligible for designation as scenic highways or have been designated as such. The status of a state scenic highway changes from eligible to officially designated when the local jurisdiction adopts a scenic corridor protection program, applies to the California Department of Transportation (Caltrans) for scenic highway approval, and receives the designation from Caltrans (Caltrans, 2017).

The nearest designated State Scenic Highway, State Route 9 (SR-9), is approximately 4.5 miles to the west. An eligible State Scenic Highway, SR-17, also lies 4.5 miles to the west.

Local Regulations

Santa Clara County General Plan

The Regional Parks and Scenic Highways Map Element of the *Santa Clara County General Plan* (updated 2008) identifies county scenic freeways, expressways, arterial, and rural routes, including both Almaden Expressway and Guadalupe Creek Trail west of Almaden Expressway, which are near the Project site.

Policies regarding scenic roads in the county include regulating signage, requiring setbacks for new structures, and controlling land use along the road in order to assure the scenic qualities of the corridors.

Envision San José 2040 General Plan

The *Envision San José 2040 General Plan* (2011) contains general goals regarding visual resources. These goals and complementary policies and actions primarily concern access to scenic resources (Goal CD-9) and maintaining attractive gateways within the City (Goal CD-10), particularly along loosely-defined "Grand Boulevards" and "Rural Scenic Corridors." By definition, Almaden Expressway and Coleman Road may be considered "Grand Boulevards." The General Plan also identifies or designates a number of scenic corridors within the City, although none are located near the Project site.

3.A.3 Impacts and Mitigation Measures

Significance Criteria

Implementation of the Project would have a significant impact on visual resources if, except as provided in Public Resources Code Section 21099, it were to:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway or other designated corridor;
- In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings.[1] If the project is in an urbanized area,[2] would the project conflict with applicable zoning and other regulations governing scenic quality; and

1 Public views are those that are experienced from publicly accessible vantage points.

2 CEQA Guidelines Section 15387 defines 'urbanized central city or a group of contiguous cities with a population of 50,000 or more, together with adjacent densely populated areas having a population density of at least 1,000 persons per square mile. A Lead Agency shall determine whether a particular area meets the criteria in this section either by examining the area or by referring to a map prepared by the U.S. Bureau of the Census which designates the area as urbanized. Maps of the designated urbanized areas can be found in the California EIR Monitor of February 7, 1979…. Use of the term "urbanized area" in Section 15182 is limited to areas mapped and designated as urbanized by the U.S. Bureau of the Census.

- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

Approach to Analysis

Visual Quality

The City of San José is considered an urbanized area, as defined in CEQA Guidelines Section 15387, and as mapped by the U.S. Census;[3] thus, considering impacts associated with degradation of existing visual character or quality may be considered in the context of potential to conflict with applicable zoning and other regulations governing scenic quality. However, as discussed in Section 3.A.2, the *Envision San José 2040 General Plan* (2011) contains general goals regarding visual resources; primarily concern access to scenic resources (Goal CD-9) and maintaining attractive gateways within the City (Goal CD-10), particularly along loosely-defined "Grand Boulevards" and "Rural Scenic Corridors." Given the limited scenic corridors and gateways in proximity to the Project and because the Project area is within an area of considerable public use and views and is in close proximity to non-urbanized areas located to the south, the District (as Lead Agency) is considering the potential for the Project to substantially degrade the existing visual character or quality of public view of the site and its surrounding.

Impacts to visual quality in non-urbanized areas are generally assessed by estimating the amount of visual change introduced by project components, the degree to which visual changes may be visible to surrounding viewer groups, and the general sensitivity of viewer groups to landscape alterations. Visual changes are usually measured by three factors: (1) the amount of visual contrast that project components create (changes to form, line, color, texture, and scale in the landscape), (2) the amount of view obstruction that occurs (loss of view, duration/timing), and (3) the degradation of specific scenic resources (e.g., removal of scenic trees).

Visual contrast would be significant if it is strong as a result of regraded landforms, alteration or elimination of ridgelines, and changes introduced by the Project that result in landscape colors, textures, and scale of visual components that are inconsistent with a project site's surroundings. View obstruction would be considered significant if the Project would obstruct foreground (0 to 0.5 mile) or middle ground (0.5 to 3 miles) views of the viewed area seen from sensitive viewpoints. The viewed area is the area of landscape within the field of vision. The sensitive viewpoint is the point from which a view of notable visual quality may be observed.

In cases where the obstruction would be temporary, such as during project construction, the amount of time the obstruction would be present or visible is considered in the impact analysis. It is generally accepted that construction activities or other temporary obstructions lasting less than one year would be considered a less than significant impact.

[3] 2010 Census – Urbanized Area Reference Map for San Jose, California: https://www2.census.gov/geo/maps/dc10map/UAUC_RefMap/ua/ua79039_san_jose_ca/DC10UA79039.pdf.

Degraded visual quality would be considered significant if the Project severely alters or displaces specific scenic resources composed of striking landform features, aesthetic water bodies, mature stands of native/cultural trees (e.g., historic hedgerows), or historic structures. This degradation would also have a temporal aspect. In the case of construction, a significant visual impact may be created if construction activities were visible for more than one year. Temporary views are also considered, as many of the views would be experienced by motorists traveling the surrounding public roadways, such as Almaden Expressway and Coleman Road. However, these viewing experiences would typically be considered less than significant, as the experience would be a matter of seconds or minutes (e.g., actively driving, waiting at a traffic signal), as opposed to a longer experience, such as visiting the Park or viewing from a residence.

Visual impacts would be considered significant overall if any one of the three measures of significance is identified. These criteria were used to assist in estimating the extent and scale of landscape alterations.

Project Assessment

This study presents the results of field observations and review of background information including Project maps, drawings, technical data, aerial and ground level photographs, and pertinent City of San José and Santa Clara County policies regarding scenic resources. Site reconnaissance was conducted on January 22, 2016 and March 23, 2016 to observe the Project area and to photograph the Project site and surrounding landscape from key representative viewing locations, including public roadways, adjacent residential areas, and nearby open space.

This information is described in the visual setting section above, and depicted in the site photographs included in that section. These photographs document the range of visual conditions seen by the public within the Project area, including locations from within Almaden Lake Park and other nearby publicly accessible areas. The photographs were taken using a digital single lens reflex (SLR) camera and “normal” 50 mm equivalent lens which represent a horizontal view angle of approximately 40 degrees. Photo viewpoint locations were documented using GPS recording and base map annotation. Of the viewpoint locations, four were selected to be developed as visual simulation viewpoints. Computer modeling and rendering techniques were employed to produce a set of visual simulation images showing existing and post-Project views. These simulations provided a clear depiction of the location, scale, and appearance of the Project and documented the visual change that would be anticipated as a result of the Project.

As much of the Project would involve revegetation and restoration of existing and newly created elements of the Park and lake, Project simulations illustrate two post-construction scenarios: views immediately after completion of construction and views eight years after completion of construction. The latter set of simulations is intended to illustrate the lasting appearance of the Project.

Visual simulations of the Project are presented in Figures 3.A-3a/b through 3.A-6a/b. The "a" simulations shows the Project immediately after completion of construction. The "b" simulations show the Project approximately 8 years after the completion of construction. The simulation viewpoint location and direction are shown in Figure 3.A-1.

Impact Summary

Table 3.A-1 provides a summary of impacts to aesthetics.

TABLE 3.A-1
SUMMARY OF AESTHETICS IMPACTS

Impact Statement	Construction	Operation
Impact 3.A-1: The proposed Project would not have a substantial adverse effect on a scenic vista.	LS	LS
Impact 3.A-2: The proposed Project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway or designated scenic corridor.	LS	LS
Impact 3.A-3: The proposed Project would substantially degrade the existing visual character or quality of public views of the site and its surroundings and would not conflict with applicable zoning and other regulations governing scenic quality.	SU	LS
Impact 3.A-4: The proposed Project would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	LS	NI

NI = No impact
LS = Less than significant
SU = Significant and Unavoidable

Impacts and Mitigation Measures

Impact 3.A-1: The proposed Project would not have a substantial adverse effect on a scenic vista. (Less than Significant)

Construction Impacts

The surrounding hills and mountains can be seen from the north, west, and east shores of Almaden Lake. While construction activities in and around the Park, including staging activities, would be visually evident in the foreground when viewing these distant vistas, these activities would be temporary in nature. The Santa Cruz and Diablo mountains would remain in view in the distance. As noted in Chapter 2, Project Description, construction measures such as installation of fences around the construction site would reduce public views. These fences would minimize the visually disruptive views of construction activities which distract from the vista view in the foreground, but the scenic vista of the surrounding mountains would not be greatly impeded. Therefore, in spite of a construction schedule lasting least 2 to 3 years the impact to scenic vistas would be less than significant during construction.

Construction of the underground outlet pipe north of Almaden Lake (~~in two alternate alignments,~~ as shown in Figure 2-5) to convey lake water to ~~Los~~ Alamitos Percolation

Pond/Los Capitancillos Percolation Ponds would be partially seen from Almaden Expressway and the Guadalupe Creek Trail. The roadway and trail would have vista views of the Santa Cruz Mountains to the south. Pipeline installation would include open trench construction, and horizontal directional drilling to install the pipeline beneath Alamitos and Guadalupe Creek. Construction activities would dominate the foreground, potentially detracting from vista views. However, the duration of pipeline construction would be less than one year. Given this relatively short duration, the impact of pipeline construction on vista views would be limited. Construction of this pipeline would have less than significant impacts on scenic vistas.

To the south of the Project area, construction of the 2,6900-foot underground pipeline that would convey imported water from Almaden Valley Pipeline to the south end of Almaden Lake would not be visible from vista views from Almaden Expressway due to intervening topography, vegetation, residential development, and/or roadside walls/fencing. ~~Views from the Alamitos Creek Trail would be minimized with construction fencing and construction activities would last less than a year.~~ Given this relatively short duration, the impact of pipeline construction on vista views would be limited. Construction of the pipeline between the Almaden Valley Pipeline and the lake would have less than significant impacts on scenic vistas.

As any construction materials and/or equipment kept at the staging sites would be blocked from public view by perimeter fencing and warehouse buildings, staging of construction materials for the Project would not impact vista views in this area, and this impact is considered less than significant overall, for construction.

Operations Impacts

As can be seen in the visual simulations, all areas disturbed or created by the Project would be revegetated and restored with native vegetation. Immediately upon completion of construction, the visible project components would be in place in the visual foreground and contoured (Figures 3.A-3a through 3.A-6a). It is anticipated that revegetation plantings would reach maturity at approximately eight years and would be visually integrated into the Park's visual appearance, including vista views from outside the Park (Figures 3.A-3b through 3.A-6b), minimizing potential for impact. The banks and lower floodplain of the restored channel would be planted with a corridor of native riparian trees and shrubs. The upper floodplain of the restored channel and berm would be planted with native herbs and grasses, interspersed with patches of upland trees and shrubs. The new lake shore and banks of the islands would be planted with wetland and aquatic species. In total, the Project would install up to eight acres of local, native vegetation (Figures 2-6 and 2-7 in Chapter 2, Project Description). Revegetation and restoration of the Project area would visually integrate the Park with the surrounding naturalistic setting, and enhance vista views from outside the Park, resulting in a less than significant impact during Project operation.[4]

[4] The simulations were developed in November 2016, and the conceptual revegetation plans have ~~evolved over time~~ since been refined and will continue to be refined through final Project design, which would occur after the completion of CEQA. In addition, since the release of the draft EIR, minor modifications to the Project Description such as the addition of a berm have been included in this Final EIR. However, these minor modification or refinement of the Project elements would result in similar aesthetic impacts as previously



Existing View from Almaden Lake Trail - east side of the lake looking northwest (VP 11)



Visual Simulation of proposed project after construction

Refer to Figure 3.A-1 for photograph viewpoint locations

SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-3a
Almaden Lake Trail - East Side
Visual Simulation of Project after Construction

described in the draft EIR and the simulations ~~are~~ continue to be substantially representative of the aesthetic elements of the Project and general placement within the landscape.



Existing View from Almaden Lake Trail - east side of the lake looking northwest (VP 11)



Visual Simulation of proposed project with landscaping at approximately 8 years of maturity

Refer to Figure 3.A-1 for photograph viewpoint locations

SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-3b
Almaden Lake Trail - East Side
Visual Simulation of Project after Eight Years



Existing View from Almaden Lake Trail - southwest side of the lake looking north (VP 15)



Visual Simulation of proposed project after construction

Refer to Figure 1 for photograph viewpoint locations

Almaden Lake Improvement Project . 130679

SOURCE: Environmental Vision

Figure 3.A-4a

Almaden Lake Trail - Southwest Side
Visual Simulation of Project after Construction



Existing View from Almaden Lake Trail - southwest side of the lake looking north (VP 15)



Visual Simulation of proposed project with landscaping at approximately 8 years of maturity

Refer to Figure 1 for photograph viewpoint locations

Almaden Lake Improvement Project . 130679

SOURCE: Environmental Vision

Figure 3.A-4b
Almaden Lake Trail - Southwest Side
Visual Simulation of Project after Eight Years



Existing View from lawn area near West Entrance Station looking east (VP 17)



Visual Simulation of proposed project after construction

Refer to Figure 1 for photograph viewpoint locations

Almaden Lake Improvement Project . 130679

SOURCE: Environmental Vision

Figure 3.A-5a
Lawn area near West Entrance
Visual Simulation of Project after Construction



Existing View from lawn area near West Entrance Station looking east (VP 17)



Visual Simulation of proposed project with landscaping at approximately 8 years of maturity

Refer to Figure 1 for photograph viewpoint locations

SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-5b
Lawn area near West Entrance
Visual Simulation of Project after Eight Years



Existing View from Coleman Road looking southwest from east of Alamitos Creek (VP 2)



Visual Simulation of proposed project after construction

Refer to Figure 3.A-1 for photograph viewpoint locations

SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-6a
Coleman Road
Visual Simulation of Project after Construction



Existing View from Coleman Road looking southwest from east of Alamitos Creek (VP 2)



Visual Simulation of proposed project with landscaping at approximately 8 years of maturity

Refer to Figure 3.A-1 for photograph viewpoint locations

SOURCE: Environmental Vision

Almaden Lake Improvement Project . 130679

Figure 3.A-6b
Coleman Road
Visual Simulation of Project after Eight Years

Following installation, the flow-through system pipelines between the Almaden Valley Pipeline and the lake, and between the lake and the Alamitos Percolation Pond, would be below ground surface and not visible. Therefore, these Project elements would not alter viewing of scenic vistas during Project operation, and this impact is considered less than significant during Project operation.

Maintenance activities in the Park would be similar to existing maintenance. Maintenance in the restored Alamitos Creek channel could include sediment removal and bank repairs as necessary. Sediment removal is estimated to only be required periodically as currently occurs under the Stream Maintenance Program ~~every ten years~~ and would only require a few weeks on activity within the downstream channel. Given the short duration, the impact of maintenance activities on vista views would be less than significant.

Mitigation Measures

None required.

Impact 3.A-2: The proposed Project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway or other designated corridor. (Less than Significant)

There are no State-designated or eligible scenic highways at or near the Project site. Almaden Expressway, which forms the western boundary of the Park, is a Santa Clara County scenic roadway. The Guadalupe Creek Trail, west of the Park, is designated as a Santa Clara County scenic corridor; however, views from this trail to the Project site are blocked by intervening topography and roadways, with the exception of the Almaden Expressway outlet pipeline alignment, which would be visible from the eastern terminus of the Guadalupe Creek Trail.

Construction Impacts

Views of the lake are available from Almaden Expressway, although they are partially screened by intervening trees within the Park and along the roadside. Mature trees and shrubs in the median further enclose views from the southbound lanes; vegetation and topography in the northwestern corner of the Park fully screen views of the lake closer to Coleman Road. Given typical traffic speeds (posted for a maximum of 50 mph) and intervening vegetation, glimpses of the lake from Almaden Expressway are brief in duration and estimated to be less than a few seconds. Therefore, the visual impact of the Project on this scenic corridor would be limited.

Open trench construction of the underground pipe along Almaden Expressway would be visible from Almaden Expressway and the eastern terminus of the Guadalupe Creek Trail. Construction of the pump station would be intermittently visible from Almaden Expressway. To the south of the Project area, construction of the 2,6~~9~~00-foot underground import pipeline would not be visible from Almaden Expressway due to intervening topography, vegetation, and development. Generally, construction activities would dominate roadway views from the

Park to the District-owned parcel approximately 0.25 mile to the north, detracting from Almaden Expressway's scenic aspects. However, the duration of pipeline construction is anticipated to be less than one year, limiting the level of effect of pipeline construction on the scenic aspects of Almaden Expressway. Therefore, construction related impacts of the Project on scenic resources are considered less than significant.

Operations Impacts

Views of the lake are available from Almaden Expressway, a county-designated scenic corridor. However, these views would continue to be partially screened by intervening trees within the Park and along the roadside. These trees would not be removed as part of the Project. Mature trees and shrubs in the roadway median would further block views from the southbound lanes; vegetation and topography in the northwestern corner of the Park fully screen views of the lake closer to Coleman Road. Given typical traffic speeds (posted for a maximum of 50 mph) and intervening vegetation, glimpses of the lake from Almaden Expressway would remain brief in duration and estimated to be less than a few seconds. Also, the flow-through system water pipelines, once constructed, would be below ground surface and not visible from this roadway, or from the eastern terminus of the Guadalupe Creek Trail. Therefore, the operation period visual impact from this scenic corridor would be less than significant.

Maintenance activities in the Park would be similar to existing maintenance. Maintenance in the restored Alamitos Creek channel could include sediment removal and bank repairs as necessary. There would be limited visibility into the channel from Almaden Expressway given intervening vegetation and travel speeds. Sediment removal is estimated to only be required periodically as currently occurs under the Stream Maintenance Program ~~every ten years~~ and would only require a few weeks on activity within the downstream channel. Given the short duration and limited viewing opportunity from Almaden Expressway, the impact of maintenance activities from scenic roadways would be less than significant.

Mitigation Measures

None required.

Impact 3.A-3: The proposed Project would substantially degrade the existing visual character or quality of public views of the site and its surroundings and would not conflict with applicable zoning and other regulations governing scenic quality. (Significant and Unavoidable)

As discussed in Section 3.A.2, the *Envision San José 2040 General Plan* (2011) contains general goals regarding visual resources, primarily concerning access to scenic resources (Goal CD-9) and maintaining attractive gateways within the City (Goal CD-10), particularly along loosely-defined "Grand Boulevards" and "Rural Scenic Corridors." Discussion of effects on scenic corridors, such as those designated in the City's General Plan are discussed in Impact 3A-2, and were determined to be less than significant. As discussed, views of the

Project and Almaden Lake are available from designated scenic corridors; however, views of the lake and Project area are viewed in passing, and in the context of existing trees, vegetation, and Park features. Access to the scenic resources associated with the scenic corridors would be maintained. Further, the 'attractiveness' of these corridors, as interpreted as 'gateways' would not be substantially altered, as further discussed below.

Construction Impacts

The Project would result in temporary, construction-related impacts on the visual character of the surrounding areas. As described in Section 3.A.1, Environmental Setting, the Project site is largely characterized by residential neighborhoods, parks and trails, a golf course, a school with athletic fields, and public utility water retention ponds. Direct public views of the Park portions of the Project site, including staging areas within the Park would be available from adjacent public roadways and sidewalks, as well as the Almaden Lake Village residential area to the east. Construction activities at the Park would continue for the entire construction period, which would exceed 2 years in duration. Project construction would include temporary erection of a fence intended to minimize views of construction activities from surrounding areas. The fence would be located on the border of the construction work area, but would not be able to fully block all views of construction. Once construction around the lake is completed, the restored channel and new levee would be planted with native vegetation and other graded areas would be seeded with grasses. The grasses would establish in a few months, but restoration plantings could take many years to become fully established. In the meantime, the vista of the lake from the Park, which is the main visual element in the fore and middle ground, would be diminished compared to existing conditions. Since construction would last more than one year, and the visual character of the lake would not be fully restored until after restoration plantings are established, the short-term impact to visual character would be significant during construction.

The District would have construction fencing installed around the Project area to minimize the visual impact and plant disturbed areas as soon as feasible given the construction schedule and seasonal requirements of planting. There are no other feasible measures to minimize the visual impact during construction and immediately after, therefore this impact is significant and unavoidable.

Construction of the flow-through system water pipelines would be seen from Almaden Expressway or from the eastern terminus of the Guadalupe Creek Trail. Construction of the inlet pipeline to the south of the Project area would be visible from residential areas adjacent to the inlet pipeline corridor. This would include the presence of construction equipment, trench spoils, etc. Construction activities would dominate views along the alignments, being visible to motorists, pedestrians, and trail users. These activities would temporarily alter visual context and quality, in comparison to the existing visual character of the immediate area. However, the duration of pipeline construction would be less than one year. Given this relatively short duration, the impact of pipeline construction on public views would be less than significant.

Construction materials and/or equipment kept at staging sites at the Winfield Warehouse and the vacant lot at Almaden Expressway and Coleman Avenue would be blocked from public view by existing perimeter fencing and warehouse buildings, with the exception of a portion of the VTA Almaden LRT station. Since the Winfield Warehouse site is an active District warehouse and storage facility, the addition of similar materials would not alter its appearance. Therefore, the Project would have limited impact to the surrounding area's visual character or quality, and construction period impacts on Project area and surrounding visual character or quality would be less than significant.

Mitigation Measures

None available.

Operations Impacts

The Project would result in noticeable alterations to the existing lake and Park (Figures 3.A-3a through 3.A-6a). It would include a new maintenance road/pathway, berm separating the park on the west side from the Alamitos Creek channel, and levee separating the channel of Alamitos Creek from the lake, a new pump station on the north side of the lake (~~either above-ground, or~~ submerged with limited visual features noticeable), as well as reconfiguration of the existing island and addition of another island in the lake. While these improvements would change visual elements of the Park and lake, they would not be considered a substantial degradation of the existing visual character of the site, as these improvements would be consistent with the general appearance of a park, including its existing visually dominant water feature. Further, specific revegetation and restoration features (i.e., vegetation type, placement, etc.) as described under Impact 3.A-1 would be consistent with those in the existing Park once established (Figures 3.A-3b through 3.A-6b).

As noted above, the Project site is already developed as a park facility. The overall visual character of the site would remain typical of an active park. Also, while the Project would be a substantial alteration of the lake, it would not constitute a strong visual contrast in the context of a park. While the total water surface area would be reduced under the Project, the resulting views would nonetheless be comprised of water and vegetated park areas. Further, the inclusion of the realigned creek and associated trail features would provide variation in landform and texture.

The flow-through system water pipelines would be below ground surface and would not be visible after construction. Therefore, operation period impacts related to degrading the existing visual character or quality of the Project site, including views of the existing Park, would be less than significant.

Maintenance activities in the Park would be similar to existing maintenance. Maintenance in the restored Alamitos Creek channel could include sediment removal and bank repairs as necessary. Sediment removal is estimated to only be required periodically as currently occurs under the Stream Maintenance Program ~~every ten years~~ and would only require a few weeks on activity within the downstream channel. Given the short duration, the impact of visual character would be less than significant.

Mitigation Measures

None required.

Impact 3.A-4: The proposed Project would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area. (Less than Significant)

Construction Impacts

The primary source of light or glare during Project construction – both in the Park and along the flow-through system water pipeline routes – would be from reflective surfaces on materials and equipment (e.g., windshields). This glare would be intermittent and fleeting due to sky conditions and equipment use and movement. As these activities would primarily occur during the typical work day (i.e., 7:00 a.m. to 7:00 p.m.), the number of active receptors would be anticipated to be low. Project construction would include temporary erection of a fence intended to block horizontal glare from construction activities. Nighttime work is not anticipated. While most construction activities would occur during the dry season, to the extent that construction could occur during winter months, early morning or early evening task lighting may be required for construction work safety when natural lighting may be low. Given the limited morning and evening work hours, substantial light trespass would not result from the temporary use of construction lighting. Construction of the Project would generate a less than significant impact due to light or glare.

Operations Impacts

The Project is not intended to develop additional buildings, windows, reflective surfaces, parking areas, roadways, etc., that would generate new sources of light or glare. Security lighting would not be required beyond what is already present in the Park. Therefore, the Project would have no impact attributable to light or glare to day or nighttime views in the area.

New maintenance activities would take place during the day and would be limited in occurrence and duration and would have a less than significant impact on light and glare.

Mitigation Measures

None required.

3.A.4 References

California Department of Transportation, (Caltrans), 2017. *California Scenic Highways,* last modified February 25, 2017.

https://www.arcgis.com/home/item.html?id=f0259b1ad0fe4093a5604c9b838a486a. Accessed December 6, 2019.

City of San José, 2011. *Envision San José 2040 General Plan*. November.

City of San José, 2007. Department of Parks, Recreation & Neighborhood Services. *Upper Guadalupe River Trail*. December.

Environmental Vision, 2016. *Visual Field Work Investigation Plan, Almaden Lake Project*. Prepared for the Santa Clara Valley Water District and Environmental Sciences Associates. August.

Santa Clara, County of. 1994, updated 2008. *Santa Clara County General Plan, 1995-2010*. December.

U.S. Department of Agriculture. Forest Service, 1995. *Landscape Aesthetics: A Handbook for Scenery Management.* USDA Agriculture Handbook No. 701.

3.B Agriculture and Forest Resources

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to agriculture and forest resources, and includes an analysis of impacts to those resources from the Project. For this assessment, agricultural and forest resources in the vicinity of Almaden Lake are generally defined by farmland classifications, important farmland designations, as established by the California Department of Conservation, Division of Land Resource Protection (DLRP), Williamson Act contracts, and other forest resources. The potential for Project implementation to adversely affect such resources through displacement or conversion of these uses, or through conflicts with the associated zoning categories are analyzed.

3.B.1 Environmental Setting

The Project is in Santa Clara County within the southern portion of the City of San José (Figure 2-1). The site area is surrounded by residential and built-up land as well as areas designated as Grazing Land by the DLRP near the southeast boundary that is currently separated from the lake by the Almaden Lake Trail, a parking lot, and Winfield Boulevard (see Farmland Designations in the Project Vicinity, below). The grazing land is situated in between the Almaden Lake Apartments to the north and the Boulder Ridge Golf Club to the south. There is no land within the Project area that is designated as forest land.

Existing City of San José land use zoning designations in the vicinity of the Project include Light Industrial District, Residence District (1DU/Acre), Agricultural District, Planned Development (Agricultural Base District), Commercial Pedestrian District, and Residence District (5DU/Acre). The purpose of the Agricultural District is to provide for areas where agricultural uses are desirable. The regulations contained in this district are intended to provide for a wide range of agricultural uses as well as implementing the goals and policies of the general plan. The San José Zoning Map[1] designates several parcels in the vicinity of Almaden Lake as an Agricultural District, although these parcels are not in agricultural use. Land use zoning can be irrespective of actual use and future use, and if a parcel is zoned agriculture it does not necessarily need to be in agriculture use to be consistent with the general plan. Existing uses zoned as an Agriculture District in the vicinity of Almaden Lake include the lawn area on the west side of Almaden Lake, and the Los Alamitos Creek Trail corridor south of Almaden Lake. Both parcels have existing park and open space uses, and are not in agricultural use.

Almaden Lake Village and Lakeview Terrace residential areas, the southern portion of the District's Winfield Warehouse property, and the District's headquarters property north of Almaden Lake are zoned as Planned Development (Agricultural Base District). These planned development zoned properties are in residential and public utility use, and are not in agricultural use. Currently, the lawn area on the west side of the lake zoned as Agricultural

[1] City of San José, 2016. Zoning Maps. Available: http://www.sanjoseca.gov/index.aspx?NID=2037, accessed February 11, 2016.

District land is owned by the City of San José, and the Alamitos Creek area is owned by the District. An active commercial nursery is located south of the Agricultural District.

Farmland Classifications

Important farmlands throughout California are designated through the California Department of Conservation (CDC) DLRP. Farmland is classified into the following categories based on soil conditions (i.e., their suitability for agriculture) and current land use.

- *Prime Farmland* is land that has the best combination of physical and chemical characteristics for long-term crop production. It has the soil quality, growing season, and moisture supply needed to sustain high crop yields when appropriately treated and managed. In addition, the land must have been used for irrigated agricultural production in the last four years to qualify under this category.
- *Farmland of Statewide Importance* is similar to Prime Farmland in that it has a good combination of physical and chemical characteristics for crop production, but with minor shortcomings such as greater slopes and less ability to store moisture.
- *Unique Farmland* is land that does not meet the criteria for Prime Farmland or Farmland of Statewide Importance but has been used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include the types of non-irrigated orchards or vineyards that are found in some climatic zones of California. Unique Farmland must have been in agricultural production at some time during the four years prior to the mapping date.
- *Farmland of Local Importance* applies to land of importance to the local agricultural economy as determined by the county. This land is either currently producing crops or has the capability of production, but does not meet the criteria of the preceding categories.
- *Grazing Land* is land on which the existing vegetation is suited to the grazing of livestock.

Farmland Designations in the Project Vicinity

Maps produced by the California Department of Conservation DLRP show that no Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, or Grazing Land occur in the Project area. The open space land to the southeast of the Project site across Winfield Boulevard, between the Almaden Lake Apartments and the Boulder Ridge Golf Course is designated as Grazing Land. The closest farmlands designated as Prime Farmland, Unique Farmland and Farmland of Local Importance are located approximately 1.5 miles northeast of the Project site, to the north of State Route (SR) 85. The nearest designation for Farmland of Statewide Importance is located north of the City of Morgan Hill (DLRP, 2019).

Williamson Act Program

The California Land Conservation Act of 1965 (commonly referred to as the Williamson Act) is the state's primary program for the conservation of private land for agricultural and open

space uses. This act is described in more detail in the Regulatory Setting section below. The DLRP prepares countywide maps of lands enrolled in Williamson Act contracts and classifies them into the categories described below.

- *Prime Agricultural Land.* This category represents the state's highest quality agricultural land. Land in this category is typically used for the production of irrigated crops or to support livestock.
- *Non-prime Agricultural Land.* This category represents Open Space Land of Statewide Significance as defined under the California Open Space Subvention Act. Most land in this category is being used for agricultural purposes, such as livestock grazing or non-irrigated crops, but may also include other open space uses that are compatible with agriculture and consistent with local general plans.
- *Land in Non-renewal.* This category represents land under a Williamson Act contract that is being terminated at the option of the landowner or local government.

Williamson Act Contracts in the Project Vicinity

None of the parcels within or immediately adjacent to the Project area are enrolled in the Williamson Act program.[2] The parcels surrounding the Project site are designated as non-enrolled and urban and built-up land. The nearest parcels designated as Williamson Act-Prime Agricultural Land or Williamson Act-Non-Renewal Land is north of SR 85. The nearest parcel designated as Williamson Act-Non-Prime Agricultural Land is east of the Boulder Ridge Golf Course. The nearest parcel designated as Williamson Act-Mixed Enrollment Agricultural Land is east of U.S. Route 101 and south of the SR 85 and U.S. Route 101 junction.

3.B.2 Regulatory Setting

Federal Regulations

The Farmland Protection and Policy Act requires an evaluation of the relative value of farmland that could be affected by decisions sponsored in whole or part by the federal government. The Farmland Protection and Policy Act would not apply to the Project because the Project is not a federal government action or program.

State Regulations

As described above, the California Land Conservation Act, or Williamson Act, is the state's primary program aimed at conserving private land for agricultural and open space use. It is a voluntary, locally administered program that offers reduced property taxes on lands whose owners place enforceable restrictions on land use through contracts between the individual landowners and local governments. The Williamson Act provides a mechanism through which private landowners can contract with counties and cities to voluntarily restrict their land to agricultural and compatible open space uses. In return, Williamson Act contracts offer tax

[2] California Department of Conservation, 2013. Division of Land Resource Protection, Santa Clara County Williamson Act Lands 2013/2014. Available: ftp://ftp.consrv.ca.gov/pub/dlrp/wa/SantaClara_13_14_WA.pdf. Accessed February 16, 2016.

incentives by ensuring that land is assessed for its agricultural productivity rather than its highest and best use. Contracts typically restrict land use for a period of 10 years; however, some jurisdictions exercise the option to extend the term for up to 20 years. Contracts are automatically renewed unless the landowner files for non-renewal or petitions for cancellation.

There are no parcels within the Almaden Lake Improvement Project area under a Williamson Act contract.

The Santa Clara County Important Farmland 2016 Map produced by the DLRP (described in Section 3.B.1, Environmental Setting) indicates that land designated as Grazing Land is in the vicinity of the Project's southeast boundary. There is no land designated as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, or Grazing Land directly within the Project area.

Local Regulations

City of San José General Plan

The *Envision San José 2040 General Plan* (2011) sets forth a vision and a comprehensive road map to guide the City's continued growth through the year 2040. *Envision San José 2040 General Plan* includes 6 sections – Thriving Community, Environmental Leadership, Quality of Life, Interconnected City, Land Use and Planning, and Implementing the Plan. The General Plan Land Use Map identifies the Project site as Open Space, Parklands and Habitat (OSPH). The OSPH designation is briefly described by the Envision San José 2040 General Plan as lands that can be publicly- or privately-owned areas that are intended for low intensity uses. Land designated as OSPH that is privately owned may be considered for low-intensity agricultural uses under certain conditions.

Parcels designated as Open Hillside that are privately owned may be allowed to support very-low intensity agricultural uses such a grazing. Publicly owned Open Hillside parcels may support uses that promote the study or appreciation of the natural environment, as well as recreational or productive uses which can include sustainable agriculture. The nearest parcel designated for Open Hillside includes the Boulder Ridge Golf Club.

The General Plan allows for agricultural uses for parcels designated for Agriculture (1DU/20AC) that include the following: grazing, dairying, raising of livestock, feedlots, orchards, row crops, nursery stock, flower growing, ancillary residential uses, ancillary commercial uses, and processing of agricultural products. The nearest parcel designated for Agriculture is southwest of the SR 85 and U.S. Route 101 junction.

Zoning

The City of San José's Zoning Ordinance is Chapter 20 of the San José Municipal Code. The San José Zoning Map designates the lawn area on the western side of Almaden Lake and the Los Alamitos Creek Trail corridor south of Almaden Lake as an *Agricultural District (*described in Section 3.B.1, Environmental Setting). The purpose of the *Agricultural District*

is to provide for areas where agricultural uses are desirable. The regulations contained in this district are intended to provide for a wide range of agricultural uses as well as implementing the goals and policies of the general plan.

3.B.3 Impacts and Mitigation Measures

Significance Criteria

Implementation of the Project would have a significant impact on agriculture and forestry resources if it were to:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency to non-agricultural use;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract;
- Conflict with existing zoning for, or cause rezoning of, forest land;
- Result in the loss of forest land or conversion of forest land to non-forest use;
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.

Approach to Analysis

Avoidance and Minimization Measures Incorporated into the Project

There are no avoidance and minimization measures specific to agriculture and forestry resources contained in the District's Best Management Practices (BMP) Handbook (SCVWD, 2014).

No Impact Significance Determinations

Based on the nature of the Program, there would be no impact related to the following criterion:

Conflict with existing zoning for, or cause rezoning of, forest land. As described in Section 3.B.1 Environmental Setting, there is no land within the Project area that is designated as forest land. Therefore, the Project would have no impact related to the conflict between the Project and existing zoning for, or cause rezoning of, forest land in the Project area and this criterion is not analyzed further.

Result in the loss of forest land or conversion of forest land to non-forest use. As described in Section 3.B.1 Environmental Setting, there is no land within the Project area that is designated as forest land. Therefore, the Project would have no impact related to the loss of forest land or conversion of forest land to non-forest use in the Project area and this criterion is not analyzed further.

Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or

conversion of forest land to non-forest use. The Project would not result in changes to the existing environment (for instance, by creating conflicting land uses or operational activities) that would prevent or interfere with agricultural production on land adjacent or near the Project site. There would be no impact related to the conversion of farmland to non-agricultural use or forest land to non-forest use.

Impact Summary

Table 3.B-1 provides a summary of agriculture impacts by implementation phase (construction and operations).

TABLE 3.B-1
SUMMARY OF AGRICULTURE AND FOREST RESOURCES IMPACTS

Impact Statement	Construction	Operation
Impact 3.B-1: The Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency to non-agricultural use.	LS	NI
Impact 3.B-2: The Project would not conflict with existing zoning for agricultural use, or a Williamson Act contract.	LS	NI

NI = No impact
LS = Less than significant

Impacts and Mitigation Measures

Impact 3.B-1: The Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency to non-agricultural use. (Less than Significant)

Construction Impacts

As described in Section 3.B.1, Environmental Setting, the site area and vicinity do not include any designated prime farmland, unique farmland, or farmland of statewide importance. Maps produced by the California Department of Conservation, Division of Land Resource Protection show that the open space land to the southeast of the Project site between the Almaden Lake Apartments and the Boulder Ridge Golf Course is designated as Grazing Land (CDC, 2019). Furthermore, there is an existing retail commercial nursery in the Project vicinity.

The closest farmlands designated as Prime Farmland, Unique Farmland and Farmland of Local Importance are located approximately 1.5 miles northeast of the Project site, to the north of State Route (SR) 85. It is possible that construction vehicles, including materials hauling activities, could occur within the vicinity of these farmlands. However, construction vehicles would be limited to existing roadways in the vicinity of the mapped Farmlands and would not affect use of the land such that conversion of use could occur.

Based on the definition of agricultural use contained in the Williamson Act, for purposes of this impact analysis, conversion to "non-agricultural use" would mean that land previously used for producing an agricultural commodity for commercial purposes is no longer capable of serving this purpose. Construction staging and access routes would be located within the defined Project boundaries (as described in Section 2.E.5 of the Project Description) and would not impact any nearby agricultural use such as the retail commercial nursery or designated Grazing Land. Project construction would not prohibit or substantially interfere with continued operation of the commercial nursery or use of adjacent land for grazing purposes. For these reasons, construction of the Project would not result in the conversion of important farmland to a non-agricultural use, and the impact would be less than significant.

Operations Impacts

Staging areas would be returned to their general pre-Project conditions after construction. Project operations would include the continuation of existing and ongoing maintenance activities at Almaden Lake as well as new activities such as routine vegetation management and maintenance road grading and upkeep. These routine maintenance activities would not impact any nearby agricultural use such as the commercial nursery or designated Grazing Land. For these reasons, operation of the Project would not result in or contribute to the conversion of important farmland to a non-agricultural use, and no impact would occur.

Mitigation Measures

None required.

Impact 3.B-2: The Project would not conflict with existing zoning for agricultural use, or a Williamson Act contract. (Less than Significant)

Construction Impacts

As described in Section 3.B.1, Environmental Setting, the City of San José Land Use Zoning Map identifies parcels in the Project area as zoned for agricultural use. However, the existing uses on these parcels are not related to agriculture, and Project construction would temporarily interrupt existing non-agricultural use of these parcels, and would return the parcels to their former non-agricultural uses after construction. For example, the construction staging area proposed on the western side of Almaden Lake operates as a park. Construction activities would temporarily restrict Park activities during Project construction. Upon completion of the Project, the parcel would return to non-agricultural park use. ~~Similarly, the Los Alamitos Creek Trail corridor south of Almaden Lake is zoned for agricultural use. However, the existing use of the creek trail corridor is for open space/park use, and the corridor is not in agricultural use. Construction activities would temporarily disrupt open space uses of portions of the trail corridor during pipeline construction. Upon completion of pipeline construction, the Los Alamitos Creek Trail would return to its non-agricultural function as open space/park use.~~ None of the parcels within or immediately adjacent to the Project area is enrolled in the Williamson

Act program (CDC, 2016). Project construction would not change the existing non-agricultural uses on parcels in the Project area zoned for agriculture or otherwise require a change in the existing zoning, and would not conflict with a Williamson Act contract. As a result, Project construction would have a less than significant impact on conflicts with existing zoning for agricultural use, or with Williamson Act contracts.

Operations Impacts

Staging areas would be returned to their general pre-Project conditions after construction. Existing non-agricultural, open space/park uses on parcels zoned for agriculture would resume. Project operations would include the continuation of existing and ongoing maintenance activities at Almaden Lake, as well as new activities such as routine vegetation management and maintenance road grading and upkeep. These routine maintenance activities would support the existing non-agricultural, open space/park uses on the parcel adjacent to the lake zoned for agriculture. ~~The Almaden Valley Pipeline connection pipeline would be buried, and the trail corridor would be revegetated similar to existing conditions. The Los Alamitos Creek Trail corridor would return to open space/park use.~~ Operation of the Project would resume existing non-agricultural, open space/park uses on parcels zoned for agriculture and the Project would not require a change in the existing zoning. None of the parcels within or immediately adjacent to the Project area is enrolled in the Williamson Act program (CDC, 2016). Because the Project would not change existing non-agricultural land uses on parcels zoned for agriculture, Project operations would not conflict with existing agricultural zoning or a Williamson Act contract. No impact would occur.

Mitigation Measures

None required.

3.B.4 References

California Department of Conservation (CDC), Division of Land Resource Protection, 2019. Santa Clara County Important Farmland, 2014-2016. Available: https://maps.conservation.ca.gov/dlrp/ciftimeseries/. Accessed July 3, 2019.

CDC, 2016. Division of Land Resource Protection, Santa Clara County Williamson Act FY 2015/2016. Available: ftp://ftp.consrv.ca.gov/pub/dlrp/wa/. Accessed June 29, 2016.

City of San José, 2011. *Envision San José 2040 General Plan*. November.

City of San José, 2019. Land Use Zoning, November 27, 2019. Available: https://www.arcgis.com/apps/webappviewer/index.html?id=6f379e130e9a43ab9dee28806ed2c885&extent=-13574341.156%2C4480904.8205%2C-13559818.1207%2C4490039.0454%2C102100. Accessed December 11, 2019.

Santa Clara Valley Water District (SCVWD), 2014. *Best Management Practices Handbook,* effective September, 2014.

3.C Air Quality

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to air quality, including criteria air pollutants (CAPs), toxic air contaminants (TACs), and odors. An analysis of impacts to air resources stemming from the Project is also provided, including identification of the appropriate CEQA baseline, a review and summary of the criteria used for determining the significance of environmental impacts, and an analysis of impacts relevant to Project implementation. Mitigation measures are also provided, as relevant, to reduce and minimize the intensity of impacts associated with the Project. If needed, District best management practices (BMPs) and mitigation measures to avoid or reduce significant impacts are also identified. For a discussion of impacts associated with greenhouse gas (GHG) emissions, please refer to Section 3.I, Greenhouse Gas Emissions.

3.C.1 Introduction

Criteria Air Pollutants

The U.S. Environmental Protection Agency (U.S. EPA) has identified certain air pollutants that are a threat to public health and welfare. These pollutants are called “criteria” air pollutants because standards have been established for each of them to meet specific public health and welfare criteria (see Section 3.C.3, Regulatory Setting, below). The following CAPs are a concern in the air basin.

Ozone

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections in humans. It can also cause substantial damage to vegetation and other materials, when present in sufficiently high atmospheric concentrations. Ozone is not emitted directly into the atmosphere. Instead, it is a secondary air pollutant that is produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NO_X). ROG and NO_X are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately 3 hours.

Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind from sources of ROG and NO_X under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds like ozone.

Ozone can cause the muscles in the airways to constrict, potentially leading to wheezing and shortness of breath (U.S. EPA, 2019a). Ozone can make it more difficult to breathe deeply and vigorously; cause shortness of breath and pain when taking a deep breath; cause coughing and sore or scratchy throat; inflame and damage the airways; aggravate lung diseases such as asthma, emphysema, and chronic bronchitis; increase the frequency of

asthma attacks; make the lungs more susceptible to infection; continue to damage the lungs even when the symptoms have disappeared; and cause chronic obstructive pulmonary disease (U.S. EPA, 2019a). Long-term exposure to ozone is linked to aggravation of asthma, and is likely to be one of many causes of asthma development, and long-term exposures to higher concentrations of ozone may also be linked to permanent lung damage, such as abnormal lung development in children (U.S. EPA, 2019a). Inhalation of ozone causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms, and exposure to ozone can reduce the volume of air that the lungs breathe in and cause shortness of breath (ARB, 2019a).

People most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers (U.S. EPA, 2019a). Children are at greatest risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, which increases their exposure (U.S. EPA, 2019a). Studies show that children are no more or less likely to suffer harmful effects than adults; however, children and teens may be more susceptible to ozone and other pollutants because they spend nearly twice as much time outdoors and engaged in vigorous activities compared to adults (ARB, 2019a). Children breathe more rapidly than adults and inhale more pollution per pound of their body weight than adults and are less likely than adults to notice their own symptoms and avoid harmful exposures. Further research may be able to better distinguish between health effects in children and adults (ARB, 2019a).

Nitrogen Oxides

Nitrogen dioxide (NO_2) is an air quality pollutant of concern because it acts as a respiratory irritant. NO_2 is a major component of the group of gaseous nitrogen compounds commonly referred to as NO_X. A precursor to ozone formation, NO_X is produced by fuel combustion in motor vehicles, industrial stationary sources (such as refineries, power plants, and chemical manufacturing facilities), ships, aircraft, and rail transit. Typically, NO_X emitted from fuel combustion is in the form of nitric oxide (NO) and NO_2, with the vast majority (95 percent) of the NO_X emissions being comprised of NO. NO is converted to NO_2 in the atmosphere when it reacts with ozone or undergoes photochemical reactions. Short-term exposures to NO_2 can potentially aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing, or difficulty breathing), hospital admissions, and visits to emergency rooms, while longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections (U.S. EPA, 2019b).

Carbon Monoxide

Carbon monoxide (CO) is a non-reactive pollutant that is a product of incomplete combustion; it is mostly associated with emissions from motor vehicle traffic. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles

also exhibit increased CO emission rates at low air temperatures. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced levels of oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia.

Particulate Matter

Particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) represent fractions of particulate matter that can be inhaled into air passages and the lungs, and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. According to a study prepared by the California Air Resources Board (ARB), exposure to ambient $PM_{2.5}$, particularly diesel particulate matter (DPM), can be associated with approximately 14,000 to 24,000 premature annual deaths per year statewide (ARB, 2010). Particulate matter also can damage materials and reduce visibility.

Toxic Air Contaminants

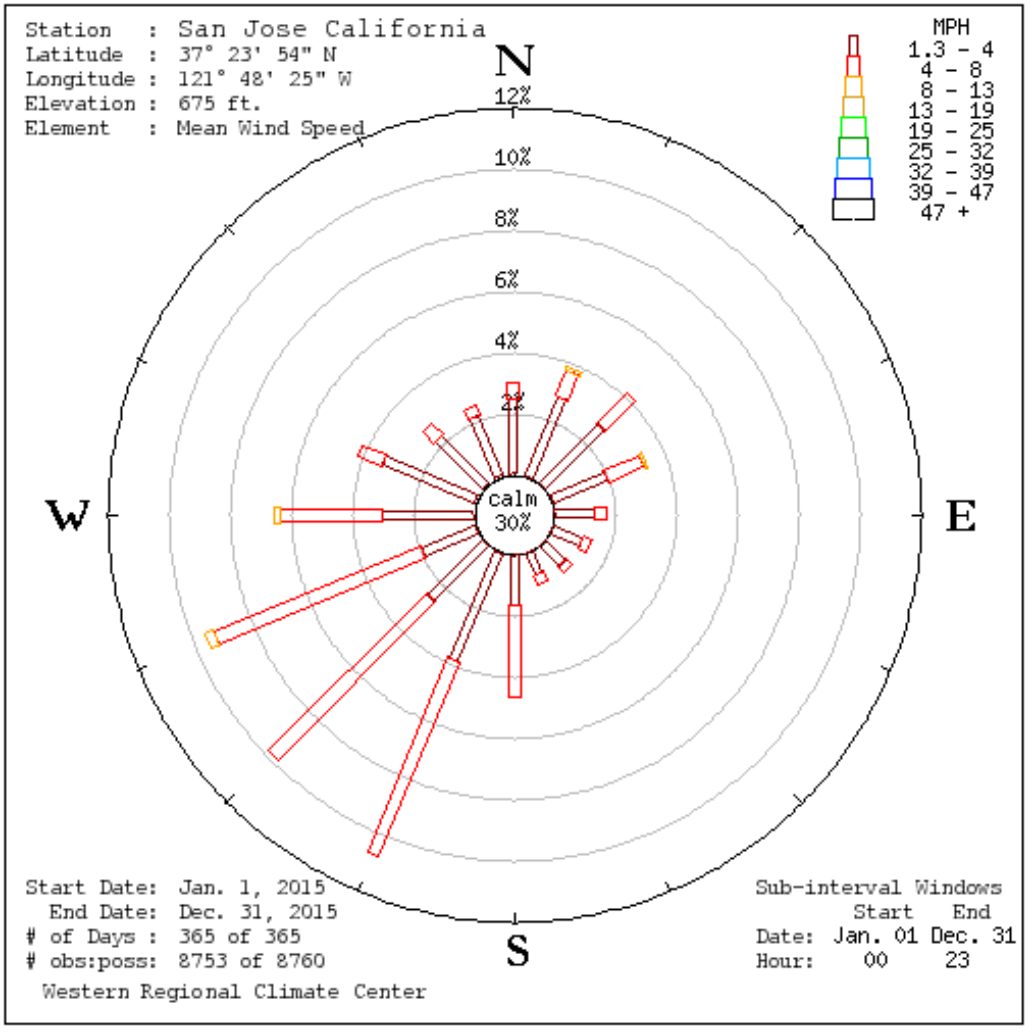
TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer-causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes approximately 200 compounds, including DPM emissions from diesel-fueled engines (ARB, 2011).

3.C.2 Environmental Setting

Regional Topography, Meteorology, and Climate

The Project site is located at the southern end of the Santa Clara Valley (Valley), which is oriented northwest-southeast and bounded by the Santa Cruz Mountains to the west, the Diablo Range to the east, the San Francisco Bay to the north and the convergence of the Gabilan Range and the Diablo Range to the south. The climate includes warm, dry summers and cool, relatively rainy winters. The Project vicinity typically has average maximum and minimum winter (i.e., January) temperatures of 58 degrees Fahrenheit (°F) and 42°F, respectively, while average summer (i.e., July) maximum and minimum temperatures are 82°F and 57°F, respectively. Total precipitation in the area averages 15 inches per year, with precipitation events being concentrated from November through April (WRCC, 2017).

As a result of the Valley's northwest-southeast axis, wind patterns in the Valley include north-northwesterly sea breezes extending up the valley during the afternoon and early evening and a light south-southeasterly drainage flow occurring during the late evening and early morning. Wind speeds are highest in the spring and summer and lowest in the fall and winter (BAAQMD, 2016). Figure 3.C-1 presents a wind rose[1] for the Project area, based on data from January 2015 to December 2015 from the San José Station, located 12 miles northeast of the Project site. As shown in the figure, winds at the San José Station blow from the southwest a majority of the time. Specifically, the four spokes around the southwest direction (W, WSW, SW, and SSW) comprise about 36 percent of all hourly wind directions. The station rarely experienced winds at speeds greater than 13 mph (WRCC, 2016b).



SOURCE: WRCC, 2016b

Figure 3.C-1
San José Wind Rose

[1] A wind rose is a figure that is used to display how wind speed and direction are typically distributed at a particular location. The length of each spoke is related to the frequency of time that the wind blows from each direction, while the colored segments within the spoke correspond to different wind speed ranges.

Air pollution in Santa Clara County can be high as a result of the large population base and extent of mobile sources in the area. Ozone is the primary pollutant of concern in the summer and $PM_{2.5}$ is the primary pollutant of concern in the winter. Ozone frequently forms on hot summer days when the prevailing seasonal northerly winds carry ozone precursors southward across the county, causing health standards to be exceeded. The high population density, wood smoke, industrial and freeway traffic, and poor wintertime air circulation caused by extensive hills to the east and west that block wind flow into the region can cause many exceedances of $PM_{2.5}$ during the winter months.

Existing Air Quality

The Bay Area Air Quality Management District's (BAAQMD's) regional monitoring network measures the ambient concentrations of CAPs. Monitoring on the Project site has not been completed; however, existing levels of air quality at the Project site can be inferred from ambient air quality measurements conducted by BAAQMD at its closest stations to the Project. The closest air quality monitoring station is the Jackson Street Monitoring Station located approximately five miles south-southeast of the Project site. The Jackson Street station monitors ozone, PM_{10}, $PM_{2.5}$, and NO_2. Table 3.C-1 shows a three-year (2015 through 2017) summary of the most up-to-date available data monitored at the Jackson Street Monitoring Station. The data are compared to the California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS).

As shown in Table 3.C-1, the state 1-hour ozone standard was not exceeded in 2015 or 2016, but was exceeded three times in 2017; the federal 8-hour ozone standards were exceeded twice in 2015 and four times in 2017; and there were no exceedances of the federal or state 8-hour standards in 2016. The 24-hour state PM_{10} standard was exceeded once in 2015, six times in 2017, and there were no exceedances of the 24-hour state PM_{10} standard in 2016. There were no exceedances of the national 24-hour PM_{10} standard during the three-year study period, and the PM_{10} annual average concentration exceeded the state standard in 2015 and 2017. The $PM_{2.5}$ 24-hour national standard was exceeded two times in 2015 and six times in 2017, and there were no exceedances of the 24-hour national $PM_{2.5}$ standard in 2016. The $PM_{2.5}$ annual average concentration did not exceed the state standard in 2015 or 2016 and there was insufficient data available or 2017. There were no exceedances of the NO_2 standards during the three-year study period.

TABLE 3.C-1
AIR QUALITY DATA SUMMARY (2015–2017) FOR THE PROJECT AREA

Pollutant	Standard	Monitoring Data by Year		
		2015	2016	2017
Ozone				
Highest State 1-Hour Average (ppm)	0.09 ppm	0.094	0.087	0.121
Days over State Standard		0	0	3
Highest National 8-Hour Average (ppm)	0.070 ppm	0.081	0.066	0.098
Days over National Standard		2	0	4
Respirable Particulate Matter (PM_{10})				
Highest State 24-Hour Average ($\mu g/m^3$) Highest 24-hour average, $\mu g/m^3$ [c]	50 $\mu g/m^3$	58.8	40.0	69.4
Measured Days over State Standard		1	0	6
Measured Days over National Standard	150 $\mu g/m^3$	0	0	0
State Annual Average ($\mu g/m^3$)	20 $\mu g/m^3$	21.9	18.3	21.3
Fine Particulate Matter ($PM_{2.5}$)				
Highest National 24-Hour Average ($\mu g/m^3$) Highest 24-hour average, $\mu g/m^3$ [c]	35 $\mu g/m^3$	49.4	22.6	49.7
Measured Days over National Standard		2	0	6
State Annual Average ($\mu g/m^3$)	12 $\mu g/m^3$	10.6	8.4	*
Nitrogen Dioxide (NO_2)				
Highest National Hourly Average (ppm) Highest 24-hour average, $\mu g/m^3$c	0.100 ppm	0.049	0.051	0.068
Measured Days over National Standard		0	0	0

NOTES: Measurements are from the Jackson Street Monitoring Station in San José.

ppm = Parts per million
$\mu g/m^3$ = Micrograms per cubic meter
* = There was insufficient data available to determine the value.

SOURCES: ARB, 2016; ARB, 2019

Sensitive Receptors

For the purposes of this air quality analysis, sensitive receptors are defined as facilities and land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals, and daycare centers. The reasons for greater than average sensitivity include pre-existing health problems, proximity to emissions sources, and/or duration of exposure to air pollutants. Schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because children, elderly people, and the infirm are more susceptible to respiratory distress and other air quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because people usually stay home for extended periods of time, which results in greater exposure to ambient air quality.

There are sensitive receptors (e.g., residences) in the immediate vicinity of the Project area. These include residences located around Almaden Lake, separated by Coleman Road,

Winfield Boulevard, and Almaden Expressway. The closest receptors that would be exposed to airborne health risks associated with Project related emissions are the residences located at Lakeview Terrace, which is east of Almaden Lake Park and Almaden Lake Village, which is north of Coleman Road and adjacent to one of the proposed access routes. Almaden Hill Estates is located south of Almaden Lake along Alamitos Creek, and would be located as close as approximately 50 feet of the pipeline connection between Almaden Valley Pipeline and Almaden Lake. Residences to the west of Almaden Lake would be as close as within approximately 100 feet of the pipeline connection between Almaden Lake and the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds. There is a senior housing complex called Le Mirador Senior Apartments, located 600 feet northwest of main Project area. There are no schools, daycare or long-term care facilities identified within 1,000 feet of the main Project area, but Pioneer High School is within 750 feet of the pipeline conveyance alignment between Almaden Lake and the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds.

Baseline Conditions

Existing Sources of Air Emissions

Existing sources of criteria pollutants at the Project site consist mainly of mobile emissions from vehicles traveling on roadways surrounding the Project site. There are no existing stationary sources of TACs at the Project site.

Existing Sources of Odors

During warm summer months, large algal blooms can occur in Almaden Lake. However, concerns regarding odors associated with the blooms have not been identified by the public. No other substantial odor-generating activities are practiced on site.

3.C.3 Regulatory Setting

Established federal, state, and regional regulations provide the framework for analyzing and controlling air pollutant emissions and thus general air quality. The U.S. EPA is responsible for implementing the programs established under the federal Clean Air Act (CAA), such as establishing and reviewing the federal ambient air quality standards and reviewing State Implementation Plans (SIPs), described further below. However, the U.S. EPA has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented. In California, the ARB is responsible for establishing and reviewing the state ambient air quality standards, developing and managing the California SIP, securing approval of this plan from the U.S. EPA, and identifying TACs. California's ARB also regulates mobile emissions sources in California, such as construction equipment, trucks, and automobiles, and oversees the activities of air quality management districts, which are organized at the county or regional level. An air quality management district is primarily responsible for regulating stationary emission sources at facilities within its geographic areas, and for preparing the air quality plans that are required

under the federal CAA and the 1988 California CAA. The BAAQMD is the regional agency with regulatory authority over emission sources in the nine county San Francisco Bay Area.

The regulatory settings for the following classes of air pollutants are discussed below: criteria pollutants, odiferous compounds, and TACs.

Federal and State

Regulation of criteria air pollutants is achieved through both national and state ambient air quality standards and emissions limits for individual sources. Regulations implementing the federal CAA and its subsequent amendments established national ambient air quality standards (national standards) for six criteria pollutants: ozone, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. California has adopted more stringent state ambient air quality standards for most of the criteria air pollutants. In addition, California has established state ambient air quality standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Because of the meteorological conditions in the state, there is considerable difference between some of state and federal standards in California, as shown in Table 3.C-2.

The ambient air quality standards are intended to protect public health and welfare, and they incorporate a margin of safety. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including people with asthma, the very young, elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

Attainment Status

Under amendments to the federal CAA, U.S. EPA has classified air basins or portions thereof as either “attainment” or “non-attainment” for each criteria air pollutant, based on whether or not the national standards have been achieved. The California CAA, which is patterned after the federal CAA, also requires areas to be designated as “attainment” or “non-attainment” for the state standards. Thus, areas in California have two sets of attainment / non-attainment designations: one set with respect to the national standards and one set with respect to the state standards. Table 3.C-2 shows the attainment status of the San Francisco Bay Area Air Basin (SFBAAB) with respect to the national and state ambient air quality standards for different criteria pollutants.

TABLE 3.C-2
AMBIENT AIR QUALITY STANDARDS AND SAN FRANCISCO BAY AREA AIR BASIN ATTAINMENT STATUS

Pollutant	Averaging Time	State Standard	SF Air Basin Attainment Status for California Standard	Federal Primary Standard	SF Air Basin Attainment Status for Federal Standard
Ozone	8 hour	0.070 ppm	Non-Attainment	0.070 ppm	Non-Attainment
	1 hour	0.090 ppm	Non-Attainment	---	---
Carbon Monoxide	8 hour	9.0 ppm	Attainment	9 ppm	Attainment
	1 Hour	20 ppm	Attainment	35 ppm	Attainment
Nitrogen Dioxide	Annual Average	0.030 ppm	---	0.053 ppm	Attainment
	1 Hour	0.18 ppm	Attainment	0.100 ppm	Unclassified
Sulfur Dioxide	Annual Average	---	---	0.030 ppm	Attainment
	24 Hour	0.04 ppm	Attainment	0.14 ppm	Attainment
	1 Hour	0.25 ppm	Attainment	0.075 ppm	Attainment
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 $\mu g/m^3$	Non-Attainment	---	---
	24 hour	50 $\mu g/m^3$	Non-Attainment	150 $\mu g/m^3$	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 $\mu g/m^3$	Non-Attainment	15 $\mu g/m^3$	Unclassified/Attainment
	24 hour	---	---	35 $\mu g/m^3$	Non-Attainment
Sulfates	24 hour	25 $\mu g/m^3$	Attainment	---	---
Lead	Calendar Quarter	---	---	1.5 $\mu g/m^3$	Attainment
	30 Day Average	1.5 $\mu g/m^3$	---	---	Attainment
	3-month Rolling Average	---	---	0.15 $\mu g/m^3$	Attainment
Hydrogen Sulfide	1 hour	0.03 ppm	Unclassified	---	---
Vinyl Chloride	24 hour	0.010 ppm	No information available	---	---
Visibility Reducing Particles	8 hour	Extinction of 0.23/km; visibility of 10 miles or more	Unclassified	---	---

NOTES: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

SOURCE: BAAQMD, 2017a.

Federal Regulations

The U.S. EPA is responsible for implementing programs established by the federal CAA, such as establishing and reviewing the NAAQS for the following air pollutants: CO, ozone, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The federal CAA also requires the U.S. EPA to designate areas (counties or air basins) as attainment or non-attainment with respect to each CAP, depending on whether the area meets the NAAQS. If an area is designated as non-attainment, it does not meet the NAAQS and is required to create and maintain a SIP for achieving compliance with the NAAQS. Conformity to the SIP is defined under the 1990 CAA amendments as conformity with the plan's purpose in eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of these standards. Air quality within the SFBAAB is classified as nonattainment for the federal 8-hour ozone and 24-hour $PM_{2.5}$ standards.

State Regulations

California's ARB is the agency delegated responsibility for preparing and submitting the SIP to the U.S. EPA. The ARB also oversees air quality policies in California and has established CAAQS for NO_2, CO, PM_{10}, $PM_{2.5}$, SO_2, ozone, lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. The CAAQS are at least as stringent (and typically more stringent) than the NAAQS.

The California CAA was approved in 1988 and requires each local air district in the state to prepare an air quality plan to achieve compliance with the CAAQS. Similar to the U.S. EPA, the ARB designates counties or air basins in California as attainment or non-attainment with respect to the CAAQS. Air quality within the basin does not attain the state standards for ozone, PM_{10} and $PM_{2.5}$.

Bay Area Air Quality Management District

The Project is within the jurisdiction of the BAAQMD, which is the local agency delegated responsibility for preparing, adopting, and implementing stationary and area air emission control measures and standards.

BAAQMD Air Quality Plans

The 1977 CAA amendments require that regional planning and air pollution control agencies prepare a regional Air Quality Plan to outline the measures by which both stationary and mobile sources of pollutants can be controlled in order to achieve all standards specified in the CAA. The California CAA also requires development of air quality plans and strategies to meet state air quality standards in areas designated as non-attainment (with the exception of areas designated as non-attainment for the state PM standards). Maintenance plans are required for attainment areas that had previously been designated non-attainment in order to ensure continued attainment of the standards. (As indicated above, air quality plans developed to meet federal requirements are referred to as SIPs).

For state air quality planning purposes, the SFBAAB is classified as a serious non-attainment area for the 1-hour ozone standard. The "serious" classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that the BAAQMD update the Clean Air Plan every three years to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data. The Bay Area's record of progress in implementing previous measures must also be reviewed. The plans for the SFBAAB are prepared with the cooperation of the Metropolitan Transportation Commission (MTC), and the Association of Bay Area Governments (ABAG). On April 19, 2017, the BAAQMD adopted the most recent revision to the Clean Air Plan - the 2017 Bay Area Clean Air Plan (2017 CAP) (BAAQMD, 2017b). The 2017 CAP serves to:

- Protect the environment and offer a long-range vision of how the Bay Area could function in a year 2050 post-carbon economy, and describes a control strategy that the BAAQMD will implement over the next 3 to 5 years.
- Update the most recent BAAQMD ozone plan, the 2010 Clean Air Plan, to fulfill State ozone planning requirements. The 2017 control strategy includes all feasible measures to reduce emissions of ROG and NO_x and reduce transport of ozone and its precursors to neighboring air basins.
- Build upon and enhance the BAAQMD's efforts to reduce emissions of fine particulate matter and toxic air contaminants.

Under the California CAA, the BAAQMD is required to develop an air quality attainment plan for non-attainment criteria pollutants within the air district. The Project is subject to BAAQMD rules and regulations governing CAPs, TACs, and odorous compounds even though permits may not be required.

City of San José

Envision San José 2040 General Plan

The *Envision San José 2040 General Plan* (General Plan) provides planning guidance for projects within the city of San José. Specific to air quality, the General Plan contains policies that pertain to the Project. In general, the applicable General Plan policies require the Project to comply with all federal and state regulations and follow the *BAAQMD CEQA Air Quality Guidelines* (BAAQMD Guidelines). Although some of the listed policies are directed to new development the Project would generate construction emissions that would be similar to construction required for new development:

> Policy MS-10.1. Assess projected air emissions from new development in conformance with the Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines and relative to state and federal standards. Identify and implement feasible air emission reduction measures.
>
> Policy MS-10.2. Consider the cumulative air quality impacts from proposed developments for proposed land use designation changes and new development, consistent with the region's Clean Air Plan and State law.

Policy MS-10.4. Encourage effective regulation of mobile and stationary sources of air pollution, both inside and outside of San José. In particular, support Federal and State regulations to improve automobile emission controls.

Policy MS-10.7. Encourage regional and statewide air pollutant emission reduction through energy conservation to improve air quality.

Policy MS-11.2. For projects that emit toxic air contaminants, require project proponents to prepare health risk assessments in accordance with BAAQMD-recommended procedures as part of environmental review and employ effective mitigation to reduce possible health risks to a less than significant level. Alternatively, require new projects (such as, but not limited to, industrial, manufacturing, and processing facilities) that are sources of TACs to be located an adequate distance from residential areas and other sensitive receptors.[2]

Policy MS-11.3. Review projects generating significant heavy duty truck traffic to designate truck routes that minimize exposure of sensitive receptors to TACs and particulate matter.

Policy MS-11.8. For new projects that generate truck traffic, require signage which reminds drivers that the State truck idling law limits truck idling to five minutes.

3.C.4 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR, an impact related to air quality is significant if implementation of the Project would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the region is in nonattainment under an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The analysis presented in this report uses the methodologies provided in the BAAQMD Guidelines, as updated in 2017 (BAAQMD, 2017c). The District, as the lead agency, has determined that Appendix D of the BAAQMD Guidelines, in combination with BAAQMD's Revised Draft Options and Justification Report, provide substantial evidence to support the applicable thresholds and, therefore, has determined they are appropriate for use in this analysis. Below are the specific thresholds that are used to judge the significance of the air quality impacts that would be associated with the Project.

[2] Policies MS-11.1, MS-11.6 and MS-11.7 were not included since they provide the same goals as MS-11.2, the most relevant policy related to the Project.

Methodology

Air Quality Plans

BAAQMD recommends that the lead agency approving a project where an air quality plan consistency determination is required analyze the project with respect to the following questions:

(1) does the project support the primary goals of the 2017 CAP?

(2) does the project include applicable control measures from the 2017 CAP?

(3) does the project disrupt or hinder implementation of any 2017 CAP control measures?

If the first two questions are concluded in the affirmative, and the third question concluded in the negative, the BAAQMD considers the project consistent with the 2017 Clean Air Plan.

Any project that would not support the 2017 Clean Air Plan goals would not be considered consistent with the 2017 Clean Air Plan. The recommended measure for determining Project support of these goals is consistency with CEQA thresholds of significance. If the CEQA thresholds of significance are exceeded, then the Project would not be considered to support the 2017 Clean Air Plan goals, and the associated impact would be significant.

Criteria Pollutants

The analysis of criteria pollutants considers the impacts related to emissions of non-attainment pollutants and their precursors. Although ozone would not be directly emitted by Project-related construction equipment, the ozone precursors ROG and NO_x would be emitted and are therefore, along with particulate matter, the focus of the impact assessment. Given that ozone formation occurs through a complex photo-chemical reaction between NO_x and ROG in the atmosphere with the presence of sunlight, the impacts of ozone are typically considered on a basin-wide or regional basis instead of a localized basis. The ambient air quality standards for ozone are concentration-based; they are not based on the mass of their precursor pollutants (i.e., NO_X and ROG). It is not necessarily the mass of precursor pollutants that causes human health effects, as opposed to the concentration of resulting ozone or particulate matter. Because of the complexity of ozone formation and the non-linear relationship of ozone concentration with its precursor gases, and given the state of environmental science modeling in use at this time, it is infeasible to convert specific emissions levels of NO_X or ROG emitted in a particular area to a particular concentration of ozone in that area. Meteorology, the presence of sunlight, seasonal impacts, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone (SCAMQD, 2014; SJVAPCD, 2014).

Impacts related to the Project contributing to an existing or projected air quality violation and whether the Project would result in a cumulatively considerable net increase of any criteria pollutant or associated precursors are judged by comparing estimated direct and indirect Project exhaust emissions to the significance thresholds, which for short-term construction emissions are 54 pounds per day for ROG, NO_X, and $PM_{2.5}$; and 82 pounds per day for PM_{10}.

Only the exhaust portion of $PM_{2.5}$ and PM_{10} emissions are compared against the construction thresholds. The BAAQMD considers implementation of its recommended mitigation measures for fugitive dust sufficient to ensure that construction-related fugitive dust is reduced to a less than significant level. Therefore, the BAAQMD recommends that analyses focus on implementation of dust control measures rather than comparing estimated levels of fugitive dust to a quantitative significance threshold. For long-term operations, the BAAQMD has two sets of significance thresholds, including daily thresholds that are the same as the construction thresholds, and annual thresholds that are 10 tons per year for ROG, NO_X, and $PM_{2.5}$; and 15 tons per year for PM_{10}.

Same as expressed in the *amicus curiae* brief submitted for the *Sierra Club v. County of Fresno* case (*Friant Ranch Case*), the significance thresholds described above were set at emission levels tied to the region's attainment status; they are emission levels at which stationary pollution sources permitted by the BAAQMD must offset their emissions and CEQA projects must use feasible mitigations, and they are not intended to be indicative of any localized human health impact that a project may have. Therefore, the Project's exceedance of the mass regional emissions threshold (i.e., pounds per day NOx thresholds) prior to mitigation from construction-related activities does not necessarily indicate that the Project would cause or contribute to the exposure of sensitive receptors to ground-level concentrations in excess of health-protective levels.

Furthermore, available models today are designed to determine regional, population-wide health impacts, and cannot accurately quantify ozone-related health impacts caused by NO_X or VOCs emissions from Project level. Therefore, it is infeasible to connect the Project level NO_X emissions to ozone-related health impacts at this time.

The primary health concern with exposure to NO_X emissions is the secondary formation of ozone. As the *amicus curiae* briefs submitted for the Friant Ranch Case suggested, because of the complexity of ozone formation and given the state of environmental science modeling in use at this time, it is infeasible to determine whether, or the extent to which, a single project's precursor (i.e., NO_X and ROG) emissions would result in the formation of secondary ground-level ozone and the geographic and temporal distribution of such secondary formed emissions. Meteorology, the presence of sunlight, seasonal impacts, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone. Furthermore, available models today are designed to determine regional, population-wide health impacts, and cannot accurately quantify ozone-related health impacts caused by NO_X or ROG emissions from local level (project level).

Community Health Risk

Impacts associated with the Project exposing sensitive receptors or the general public to substantial pollutant concentrations are evaluated by assessing the health risks posed by the placement of new sources of TAC emissions near existing sensitive receptors. Specifically, according to the BAAQMD, the Project would have a significant air quality impact if the construction phase would expose persons to substantial levels of TACs, such that the probability of contracting cancer exceeds 10 in one million, or if it would expose persons to

pollutants such that a chronic Hazard Index of 1.0 would be exceeded. The Project would not site any new sources of TAC emissions and would have no operational health risk impacts. The Project's only source of TAC emissions is DPM exhaust from off-road equipment and heavy duty trucks during construction. DPM does not have any measurable acute health risks and therefore no exposure threshold exists for this pollutant.

In addition, a significant impact would occur if construction of the Project would result in an incremental increase in annual average ambient concentrations of $PM_{2.5}$ of more than 0.3 microgram per cubic meter ($\mu g/m^3$). The Project would have a significant cumulative health risk impact if the combined cancer risk associated with all local permitted stationary sources and major roadways plus the risks associated with the Project at the maximally exposed individual (MEI) exceeds 100 in one million, results in a non-cancer Hazard Index that exceeds 10, or results in incremental increase in annual average $PM_{2.5}$ concentrations that exceed 0.8 $\mu g/m^3$ (BAAQMD, 2017c).

Odors

Impacts related to the Project creating or exposing a substantial number of people to objectionable odors is evaluated based on the potential for the Project to generate odors that could affect nearby sensitive receptors.

Approach to Analysis

Construction- and operation-related emissions associated with Project were quantified using the methods described below for comparison to the BAAQMD Project-level thresholds discussed previously.

Construction Emissions

Exhaust criteria pollutant emissions that would be associated with the on-site and off-site construction-related activity for the Project were estimated using the latest available version of the California Emissions Estimator Model version 2016.3.2 (CalEEMod). CalEEMod was developed by the South Coast Air Quality Management District and other California air districts for the specific purpose of assisting lead agencies in determining a project's air quality impacts. The model combines the databases from both ARB's EMFAC and OFFROAD models into a single tool and captures most of the Project's emissions producing activities associated with construction equipment, worker vehicles and heavy duty trucks. A standalone spreadsheet with industry-based locomotive and railroad calculations and criteria pollutant emission factors was utilized to derive emissions from rail hauling of mercury-laden sediment removed from Almaden Lake.

Project assumptions for the air quality analysis were developed in consultation with District staff to reflect each phase of the Project's construction; and assuming a conservative construction scenario (as compared to the existing Project, as described in Chapter 2, Project Description) with maximum concurrent activities, which would result in an expedited overall construction schedule of 24 months. This information consisted of a customized

phased schedule along with a list of required off-road construction equipment, equipment daily use hours and workdays, worker trips, vendor trips, hauling trips, and trip mileage rates required to complete the Project. This information was then entered into CalEEMod to estimate the Project's annual construction-related criteria pollutant mass emissions. CalEEMod defaults were used for Project components in which there were no Project-specific data. Appendix B (Air Quality and Greenhouse Gas Report) contains the construction schedule, emissions spreadsheets, and CalEEMod output sheets used to quantify the Project's criteria pollutant construction emissions.

The District identified two disposal options for lake bed sediment found to exceed maximum contamination standards for local disposal: hauling via heavy duty trucks to an approved disposal site in Kettleman City, California or hauling via heavy duty trucks to the Port of Oakland, where sediments would be loaded onto railcars and shipped via rail to an approved disposal site in Utah. The scope of criteria pollutants analysis related to this activity was limited to emissions that would occur within the nine-county BAAQMD jurisdiction. In order to provide the most conservative and worst-case scenario, emissions were calculated for the second, farther truck hauling distance with railcar shipping option. Therefore, the analysis presented below represents a worst-case scenario.

It should be noted that although the one-time hauling of lakebed sediment by railcars would result in locomotive emissions in other California air basins as well as in Nevada and Utah, these emissions were not quantified and compared to the significance thresholds because they would occur outside of the BAAQMD's jurisdiction and it would be speculative at this time to define the route(s) that the railcars would take outside of the air basin. Since analysis of criteria pollutants is dependent on the location they would be generated and the route(s) that would be selected by the railroad to the disposal facility are currently unknown, analysis outside of the air basin has not been conducted. A standalone locomotive and railroad spreadsheet containing specific data such as diesel fuel consumption, number of railroad cars needed, railroad car capacities, railroad car weights, etc., was created to quantify emissions from the hauling of removed lake bed sediment. Based on the above regional methodology, criteria pollutant emissions for the roundtrip rail distance from Oakland, California to the approximate BAAQMD jurisdictional border in northeastern Solano County were calculated and added to the Project's on-site and off-site GHG emissions. The Project's construction period emissions were then divided by a conservative estimate of the total number of construction work days (i.e., 506 workdays) and converted into pounds to derive the average daily construction emissions. Appendix B contains the emissions summary spreadsheet used for these calculations.

Health Risk

A health risk assessment (HRA) evaluated the risks to nearby receptors from exposure to TACs associated with the Project (Appendix B). The HRA focused on construction emissions at the Project site, which is considered a new but temporary source. The HRA focused on cancer risks, chronic health hazards, and $PM_{2.5}$ concentrations at residences located near the Project site.

Consistent with BAAQMD Guidelines, the following analysis assesses health risk and hazard impacts at sensitive receptors located in the vicinity of the Project site. Since the construction emissions associated with the Project would represent a new emissions source, the health risk and hazard impacts are analyzed at the receptor that would be exposed to the maximum risk, hazard, and $PM_{2.5}$ concentrations.

For construction activities, DPM exposure represents the primary health hazard. DPM is a complex mixture of chemicals and particulate matter identified by the State as a TAC with potential cancer and chronic non-cancer effects. DPM emissions would be generated by the operation of off-road construction equipment (e.g., excavators, loaders, cranes, graders) and on-road heavy-duty vehicles that burn diesel fuel. Although other exposure pathways exist (i.e., ingestion, dermal contact), the inhalation pathway is the dominant exposure pathway from DPM for both cancer risk and chronic non-cancer health effects. Consequently, this HRA only evaluates the inhalation cancer and chronic non-cancer effects of DPM inhalation.

A three-step process was used to estimate cancer risks and chronic health hazards of DPM exposure. The first step involved using the CalEEMod software program to estimate average annual diesel exhaust emissions during Project construction. The second step involved using the AERMOD dispersion model to convert emissions to maximum annual DPM concentrations. The dispersion modeling used average annual DPM emissions, receptor locations, emission sources, and meteorological data collected at the Norman Y. Mineta San José Airport station, the station nearest to the Project site. For this Project, two separate sources were included in the dispersion modeling:

- One polygon area source representing the on-site construction equipment within the main Project area;[3] and
- Three area line sources representing heavy duty truck traffic to and from the Project site along Almaden Expressway, Coleman Road, and Winfield Boulevard to the extent of the modeling domain.

The above sources represent the worst case scenario from DPM emissions occurring at the Project's nearest receptor. Average emission rates from each of the above sources were separately simulated in the same model run to determine DPM concentrations. In order to identify the MEI for the Project in AERMOD, discrete cartesian receptors were placed to simulate the surrounding residences located in the 1,000-foot vicinity of the Project site. The BAAQMD does not require receptors to cover precise locations but rather a representative grid of sensitive areas; residential areas modeled were configured with a receptor grid placing of 50 meters by 50 meters. According to BAAQMD, fenceline receptors should only be employed if there are existing or reasonably anticipated future sensitive receptors that would be residing in that area (BAAQMD, 2012). It is not feasible for any future residential

[3] Given the linear nature of pipeline construction, exposure to emissions from construction of the flow-through system water pipelines connecting Almaden Lake to Almaden Valley Pipeline to the south and the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds to the north would be less than two months at any given residence location; therefore, those emissions sources were included in the main polygon area source for the Project, rather than modelled as their own area sources.

development to be constructed around Almaden Lake and therefore no fenceline receptors were required. Although Pioneer High School is outside of the 1,000-foot Project site radius, as a conservative approach, two additional discrete cartesian receptors were modeled to represent the exposure for both indoors the school buildings and outdoors in the school yard. The third step involved using the Office of Environmental Health Hazard Assessment (OEHHA) guidance to convert maximum concentrations to cancer risks and chronic health hazards (OEHHA, 2015). The results of the HRA are discussed in the impacts and mitigation measures section below.

Operations Emissions

Motor Vehicle Emissions

The City of San José would be responsible for maintenance of the new open park area, while anticipated maintenance activities for the District would include embankment and levee inspection and repair, sediment removal from the restored creek, levee settlement adjustment, restored vegetation maintenance and management along the restored creek and islands, lake water quality monitoring, and maintenance road grading and upkeep.

Maintenance of the new park area would be incorporated into existing City maintenance at the park and would not generate new traffic or emissions. Maintenance of the restoration plantings is estimated to require one additional truck trip would occur every two weeks for the first three years after construction of the Project. Maintenance of the new levee would require visits by District crews a couple times a year. Embankment repair and levee settlement adjustment would only be required if necessary; the Project would be designed to be stable and not require such maintenance. Sediment removal is estimated to be needed only periodically downstream of the Lake as currently occurs under the Stream Maintenance Program ~~every ten years~~ and would require a small work crew a week or two to complete the work.

Stationary Sources

The Project would establish a water pump station on the northern end of the lake containing two or three electric pumps. There would be indirect emissions from the electricity required to power the electric pump, which would be generated by existing power plants that are regulated by air district stationary source permits such that air quality standards would be attained/maintained

Health Risk

Project operation would not result in the combustion of diesel fuel or other activities that would emit TACs. Therefore, there would be no TAC emissions generated or associated health risks from the Project's operation.

Impact Summary

Table 3.C-3 provides a summary of impacts to air quality.

TABLE 3.C-3
SUMMARY OF AIR QUALITY IMPACTS

Impact Statement	Construction	Operation
Impact 3.C-1: The Project would conflict with or obstruct implementation of the applicable air quality plan.	LSM	LSM
Impact 3.C-2: The Project would result in a cumulatively considerable net increase of a criteria air pollutant for which the SFBAAB is in non-attainment under applicable federal and state ambient air quality standards.	LSM	LS
Impact 3.C-3: The Project would expose sensitive receptors to substantial pollutant concentrations.	LSM	LS
Impact 3.C-4: The Project would not result in emissions that lead to odors affecting a substantial number of people.	LS	LS

LS = Less than significant
LSM = Less than significant with mitigation

Impacts and Mitigation Measures

Impact 3.C-1: The Project would conflict with or obstruct implementation of the applicable air quality plan. (Less than Significant with Mitigation)

Construction and Operation Impacts

The most recently adopted air quality plan for the Project area is the 2017 CAP. The 2017 CAP focuses on two closely-related goals: protecting public health and protecting the climate. The 2017 CAP is an update to the BAAQMD's 2010 Ozone Strategy to comply with State air quality planning requirements. The 2017 CAP also serves as a multi-pollutant air quality plan to protect public health and the climate. The 2017 CAP control strategy includes revised, updated, and new measures in the three control measure categories: stationary sources, transportation, and buildings and energy.

2017 CAP Transportation Control Measure TR22, *Construction, Freight, and Farming Equipment*, appears to be the only measure applicable to the Project. It provides incentives for the early deployment of electric, Tier 3, and 4 off-road engines used in construction, freight, and framing equipment. Lack of compliance with this requirement would be considered a significant impact associated with conflict or obstruction of implementation of the applicable air quality plan. To avoid this impact the District and/or its construction contractors would be required to use off-road diesel construction equipment compliant with U.S. EPA Tier 4 non-road engine standards per Mitigation Measure 3.C-1a (*U.S. EPA Tier 4 Engines*). Therefore, the Project as mitigated would be consistent with the intent of Transportation Measure TR22, and the impact would be less than significant with mitigation.

If the Project does not support the 2017 CAP goals, it would not be considered consistent with the 2017 CAP, resulting in a significant impact.

In addition to Mitigation Measure 3.C-1a, Mitigation Measure 3.C-1b (BAAQMD Basic Construction Measures) includes recommended measures to support 2017 CAP goals.

Thus, Project-related construction emissions with mitigation measures incorporated would not conflict with the applicable air quality plan resulting in the less than significant impact.

Future maintenance of the Project, such as sediment removal and bank repair activities, would comply with the same mitigation measures to ensure they are consistent with applicable air quality plans, and be considered less than significant with mitigation for operations.

Mitigation Measures

Mitigation Measure 3.C-1a: *U.S. EPA Tier 4 Engines*. The Santa Clara Valley Water District and/or its construction contractors shall be required to use off-road diesel construction equipment compliant with U.S. EPA Tier 4 nonroad engine standards. Prior to the commencement of construction activities, the construction contractor and/or the Santa Clara Valley Water District shall prepare an equipment list that identifies each piece of off-road equipment to be operated at the Project site by its equipment identification number (EIN) and demonstrates that each piece of equipment meets U.S. EPA Tier 4 nonroad engine standards. The list shall be made available at the construction site and shall be updated when new or replacement construction equipment are brought to the site.

Mitigation Measure 3.C-1b: *BAAQMD Basic Construction Measures*. The Santa Clara Valley Water District and/or its construction contractors shall comply with the following applicable BAAQMD Basic Construction Mitigation Measures:

BAAQMD Basic Construction Measures

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks and railcars transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
8. Post a publicly visible sign with the telephone number and person to contact at Santa Clara Valley Water District regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

Impact Significance After Mitigation: Less than Significant. The District and contractors would implement Mitigation Measures 3.C-1a (U.S. EPA Tier 4 Engines) and 3.C-1b (BAAQMD Basic Construction Measures) for construction and ground-disturbing maintenance activities. These measures would ensure that the Project fully complies with the 2017 CAP and other air quality plans.

Impact 3.C-2: The Project would result in a cumulatively considerable net increase of a criteria pollutant for which the SFBAAB is in non-attainment under applicable federal and state ambient air quality standards. (Less than Significant with Mitigation)

The BAAQMD thresholds of significance for construction and operation represent the levels at which a project's individual emissions of criteria air pollutants or precursors would result in a cumulatively considerable contribution to the SFBAAB's existing air quality conditions. If daily average construction or operation emissions, or annual operation emissions of criteria air pollutants or precursors would exceed these thresholds, a project would result in a cumulatively significant impact. As presented in the discussions below, the Project's construction emissions would exceed the applicable BAAQMD NO_x threshold, but the recommended Mitigation Measures 3.C-1a and 3.C-1b would reduce NO_x emissions to below this threshold. In addition, the Project's long-term operational emissions would not exceed the applicable thresholds. Therefore, the Project would not result in a cumulatively considerable net increase in any pollutants for which the SFBAAB is in non-attainment under applicable federal or state ambient air quality standards.

Construction Impacts

Criteria pollutant emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ from construction equipment, worker trips, vendor trips, hauling trips, and locomotives associated with removed lake bed sediment via railroad would incrementally add to the regional atmospheric loading of these pollutants during construction of the Project. For this analysis, the Project's construction is conservatively assumed to occur over a period of approximately 24 months, commencing at the earliest in June 2022 ~~2021~~, and finishing in 2024 ~~2023~~.[4] Table 3.C-4 presents the estimated average daily construction exhaust emissions that would be associated with the Project.

[4] The projected construction start has been revised to 2022; however, the emission calculations are based on an assumption of a June 2021 construction start, which is a more conservative assumption because the CalEEMod emissions model uses emissions factors for equipment and vehicle inventories that lower emissions each calendar year due to the introduction of new lower-emitting equipment and vehicles each year and the retirement of older higher-emitting equipment and vehicles each year. In addition, the average daily emission estimates are based on a compact schedule of less than 24 months, while the Project is proposed to be constructed over a longer period of at least 30 months. Since the average daily emissions are estimated by dividing the total emissions by the number of workdays, the compact schedule has the effect of overestimating on-site and off-site construction emissions by up to 25 percent. For these reasons, the Draft EIR emission estimates have not been revised to reflect the new Project information (i.e., start date and revisions to Table 2-3), and they continue to represent a conservative estimate for the Project.

TABLE 3.C-4
TOTAL AVERAGE DAILY CONSTRUCTION EMISSIONS

Parameter	Pounds/day			
	ROG	NO_x	Exhaust PM_{10}	Exhaust $PM_{2.5}$
On-site and Off-site Construction	6.73	90.53	2.21	2.09
Railroad Hauling	0.14	2.84	0.06	0.06
Total	6.87	93.37	2.28	2.15
BAAQMD Construction Threshold	54	54	82	54
Significant Impact?	No	Yes	No	No

NOTE: Refer to Appendix B for the emissions estimate calculations and all of the associated assumptions.

As shown in Table 3.C-4, estimated emissions of ROG, PM_{10}, and $PM_{2.5}$ would not exceed the applicable significance thresholds; however, exhaust emissions of NO_X would exceed the significance threshold, resulting in a cumulatively considerable significant impact.

Implementation of Mitigation Measures 3.C-1a and 3.C-1b as shown below, would be required to reduce construction NO_x emissions below the applicable threshold. Although implementation of Mitigation Measure 3.C-1b would reduce NO_x emissions through the minimization of idling times and proper engine maintenance and tuning, the demonstration of reducing Project construction NO_x emissions was quantified based on assumptions associated with Mitigation Measure 3.C-1a. In order to estimate these reductions, Tier 4 engines were selected for all construction equipment utilizing the mitigation screen in CalEEMod. The output was then converted into average daily emissions using the same methodology described above. The U.S. EPA has required that new engines in equipment manufactured in 2015 and beyond meet the Tier 4 non-road engine standards. The Project would commence construction no earlier than mid-2022 ~~2021~~ thus providing a high likelihood that equipment from this tier would be available for use.

Table 3.C-5 presents the average mitigated daily construction emissions estimates for the Project. Estimated emissions of ROG, NO_x, PM_{10}, and $PM_{2.5}$ would not exceed the applicable significance thresholds with implementation of Mitigation Measures 3.C-1a and 3.C-1b.

TABLE 3.C-5
TOTAL AVERAGE DAILY MITIGATED CONSTRUCTION EMISSIONS

Parameter	Pounds/day			
	ROG	NO_x	Exhaust PM_{10}	Exhaust $PM_{2.5}$
On-site and Off-site Construction	2.50	44.36	0.28	0.27
Railroad Hauling	0.14	2.84	0.06	0.06
Total	2.64	47.20	0.34	0.33
BAAQMD Construction Threshold	54	54	82	54
Significant Impact?	No	No	No	No

NOTE: Refer to Appendix B for the emissions estimate calculations and all of the estimate assumptions.

In addition to exhaust emissions, emissions of fugitive dust would also be generated by Project-related construction activities associated with grading and earth disturbance, travel on paved and unpaved roads, and other construction related activities. With regard to fugitive dust emissions, the BAAQMD Guidelines focus on implementation of dust control measures rather than comparing estimated levels of fugitive dust to quantitative significance thresholds. Therefore, to reduce cumulatively considerable impacts related to emissions of fugitive dust associated with Project construction to a less than significant level, implementation of Mitigation Measure 3.C-1b, which includes the BAAQMD's applicable recommended fugitive dust control measures, would be required. Implementation of Mitigation Measures 3.C-1a and 3.C-1b would reduce the impact associated with exhaust emissions of NO_X and fugitive dust emissions to a less than significant level by minimizing idling times, ensuring proper engine maintenance and tuning, requiring use off-road diesel construction equipment compliant with U.S. EPA Tier 4 nonroad engine standards, and requiring implementation of BAAQMD's applicable recommended fugitive dust control measures. With implementation of Mitigation Measures 3.C-1a and 3.C-1b, Project construction would not result in a cumulatively considerable net increase of NO_X or fugitive dust emissions, and the impact would be less than significant with mitigation.

Operations Impacts

Future maintenance of the Project could include sediment removal and bank protection activities. Sediment removal is only anticipated to be needed periodically downstream of the Lake as currently occurs under the Stream Maintenance Program ~~once every ten years~~ and would only last a few weeks in duration. Bank repair and levee settlement adjustment are not anticipated and would only be conducted as necessary. Earth moving activities, such as sediment removal and bank repair would be done consistent with Mitigation Measure 3.C-1a and 3.C.1b as discussed under Impact 3.C-1. The exact timing, equipment, and frequency of these events is unknown and cannot be quantified; however, they represent a small fraction of the emissions that would be generated during Project construction and would not appreciably increase overall emissions reported in Table 3.C-5.

The only other applicable operational activities associated with the Project, that do not occur presently, would be from occasional worker vehicle trips to the Project site in order to maintain the landscaping, during the first three years of the Project's operation, and to conduct levee inspections a few times a year. These infrequent maintenance activities and vehicle trips would be intermittent and would produce negligible emissions.

Ongoing operation of electric pumps at the Project site would not generate airborne emissions at the site and emissions resulting from the generation of electricity are subject to stationary source permits that ensure that air quality standards are attained/maintained. Therefore, operation period emissions from the Project would not be considered cumulatively considerable, and the associated impact would be less than significant.

Mitigation Measures

Implement Mitigation Measures 3.C-1a and 3.C-1b.

Impact Significance After Mitigation: Less than Significant. The District and contractors would implement Mitigation Measures 3.C-1a (U.S. EPA Tier 4 Engines) which requires the use of cleaner burning engines which would reduce the emission of NO_x to below the significance threshold established by BAAQMD and used for this analysis. Mitigation Measure 3.C-1b (BAAQMD Basic Construction Measures) in combination with 3.C-1a would minimize the generation and emission of dust during construction and maintenance consistent with BAAQMD guidance to less than significant levels.

Impact 3.C-3: The Project would expose sensitive receptors to substantial pollutant concentrations. (Less than Significant with Mitigation)

Construction Impacts

The various construction activities associated with the Project would generate exhaust emissions, including DPM—a known TAC. Exposure of sensitive receptors to TAC emissions could result in an elevated health risk. Under the Office of Environmental Health Hazard Assessment (OEHHA) Guidelines, DPM is used as a surrogate measure of carcinogen exposure for the mix of chemicals that make up diesel exhaust as a whole (OEHHA, 2015).

The HRA quantified cancer risks, chronic non-cancer health hazards, and average annual $PM_{2.5}$ concentrations for nearby receptors based on the Project's annual average PM_{10} emissions, and compared these to the BAAQMD's corresponding thresholds of significance (Appendix B). To evaluate cancer health impacts, the maximum incremental cancer risk from inhalation exposure to TACs was calculated following the guidelines established by OEHHA. Non-cancer health risk is based on hazard indices established by OEHHA for chronic (long-term) exposures. The annual average $PM_{2.5}$ concentration was calculated by multiplying the ratio of the Project's $PM_{2.5}$ to PM_{10} emissions by the annual PM_{10} concentration estimated using AERMOD.

Assuming that construction of the Project would occur over a 24-month period between 2022 ~~2021~~ and 2024 ~~2023~~, the annual average construction emissions associated with the Project was determined for the purpose of the HRA. It was assumed that the MEI in the vicinity of the Project site would be exposed to the annual average TAC concentrations throughout the construction period; however, during the actual construction process, the location of equipment would vary within the Project site, and TAC concentrations at the MEI would change. Discrete cartesian receptors described above, allowed for an examination of TAC concentrations throughout the vicinity of construction activities.

Construction-related emissions of DPM (using PM_{10} exhaust as a surrogate) associated with the Project were calculated using emissions rates derived from CalEEMod, as described under the Approach to Analysis section, above. This assumption is also conservative since DPM represents a portion of total particulate emissions from exhaust, but is consistent with regulatory guidance.

Annual average emission rates for the worst-case construction scenario were converted from pounds per day in CalEEMod to grams per second to estimate annual average concentrations which included the polygon area source and two lines sources. AERMOD was set up to assume a constant emission rate using 2009 through 2013 meteorological data, the latest years available, to determine a representative entire year of construction. Although a constant emission rate was assumed, the variable emissions scenario in AERMOD was utilized to accurately restrict construction emissions to only occur within daytime construction hours during weekdays. Figure 3.C-2 shows the approximate location of the MEI receptor for cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentration during the construction phase.

Once the Project's DPM concentration at the MEI was known, the ARB's HARP 2 RAST was used to derive both cancer and non-cancer chronic risks. Consistent with BAAQMD Guidelines, a 3-year exposure duration was utilized with exposure starting in the third trimester. The inclusion of this lifestage applies the most conservative weighting for exposures to account for increased sensitivity to carcinogens from late pregnancy through childhood known as an Age Specific Factor. As the MEI Receptor was identified as a residence, the OEHHA default breathing rates and fraction at time of residence for all age groups were also included.



Figure 3.C-2
Approximate Location of MEI Receptor
during Project Construction

Table 3.C-6 presents the health risk assessment results for the Project's construction period based on OEHHA calculation methodologies.

TABLE 3.C-6
PROJECT CONSTRUCTION HEALTH RISK ASSESSMENT RESULTS[A]

Parameters	Cancer Risk[b]	$PM_{2.5}$[c]	Chronic HI[d]
Maximally Exposed Individual Receptor (Resident)	48.4	0.22	0.15
BAAQMD Thresholds of Significance	10	0.3	1.0
Exceeds Threshold?	*Yes*	*No*	*No*

NOTE: Refer to Appendix B (Health Risk Assessment)

[a] The results represent the health risks associated with construction of the Project.
[b] Chances in 1 million.
[c] Particulate Matter of 2.5 microns or less concentration is expressed as annual average in micrograms per cubic meter ($\mu g/m^3$).
[d] Hazard Indices (HI) are dimensionless.

The maximum annual average $PM_{2.5}$ concentration would be up to 0.22 $\mu g/m^3$ at the MEI, which would not exceed the BAAQMD's significance threshold of 0.3 $\mu g/m^3$. TAC exposure from the Project's construction emissions would result in a maximum chronic hazard index of 0.15, which is below the BAAQMD thresholds of 1.0. However, based on the assessment methods described above, the MEI would be exposed to an incremental cancer risk of 48.4 in 1 million, which is above the BAAQMD threshold of 10 in 1 million. Therefore, overall Project-related construction activities would expose existing sensitive receptors to substantial pollutant concentrations; this is considered a significant impact.

Implementation of Mitigation Measure 3.C-1a, using the same calculation methodology as described in Impact 3.C-2, would reduce cancer risks from the Project's construction to below the applicable threshold. Implementation of Mitigation Measure 3.C-1b, would require that any mercury contaminated sediment removed from the Project site would be properly watered and covered during haul truck transport. This would minimize toxic airborne risks associated with fugitive dust from mercury contaminated soils or sediment from the Project. Table 3.C-7 presents the health risk assessment results that would be associated with the Project's mitigated construction emissions.

TABLE 3.C-7
MITIGATED PROJECT CONSTRUCTION HEALTH RISK ASSESSMENT RESULTS[A]

Parameter	Cancer Risk[b]	$PM_{2.5}$[c]	Chronic HI[d]
Maximally Exposed Individual Receptor (Resident)	5.1	0.03	0.01
BAAQMD Thresholds of Significance	10	0.3	1.0
Exceeds Threshold?	*No*	*No*	*No*

NOTE: Refer to Appendix B (Health Risk Assessment)

[a] The results represent the health risks associated with construction of the Project.
[b] Chances in 1 million.
[c] Particulate Matter of 2.5 microns or less concentrations are expressed as annual average in micrograms per cubic meter ($\mu g/m^3$).
[d] Hazard Indices (HI) are dimensionless.

Based on the implementation of the mitigation described above, the MEI would be exposed to an incremental cancer risk of 5.1 in 1 million, which is below the BAAQMD threshold of 10 in 1 million. Overall, mitigated Project-related construction activities would not expose existing sensitive receptors to substantial pollutant concentrations.

In accordance with BAAQMD guidance for a complex source and using a conservative approach to evaluate the cumulative health risks from the Project, all TAC and $PM_{2.5}$ sources within a 0.25-mile radius of the Project boundary to the maximally exposed receptor were identified. According to the City of San José's Planning Division, there is currently one other construction project that would include installation of new park equipment at the existing Park on the corner of Almaden Expressway and Coleman Road that would occur in this radius during the Project's construction. The health risks at the MEI that would be associated with eight months of construction for this cumulative project are unknown, but is conservatively assumed to be the same or less than those that would be associated with the Project. Using the BAAQMD's Health Risk Screening and Distance Multiplier Tools, two existing TAC sources within the 0.25-mile radius were identified and their cancer and non-cancer chronic risks, and annual average $PM_{2.5}$ concentrations were calculated and included in Table 3.C-8. Refer to Appendix B for the detailed calculations and methods to derive these values.

Table 3.C-8 presents the cumulative health risk assessment results for the mitigated Project's construction period. Based on the assessment methods described above, the MEI would be exposed to an incremental cancer risk of up to 14.2 in 1 million, which is below the BAAQMD cumulative threshold of 100 in 1 million. The annual average $PM_{2.5}$ concentration at the MEI would be up to 0.12 µg/m^3, which is below the cumulative threshold of 0.8 µg/m^3. The chronic non-cancer hazard index would be up to 0.03, which is below the cumulative threshold of 10.0.

TABLE 3.C-8
CUMULATIVE MITIGATED PROJECT HEALTH RISK ASSESSMENT RESULTS[A]

Source	Health Risks at the MEI		
	Cancer Risk[b]	$PM_{2.5}$[c]	Chronic Hi[d]
Project	5.1	0.03	0.01
City of San José Park Improvements at Coleman Road and Almaden Expressway	≤5.1	≤0.03	≤0.01
Santa Clara Valley Water District FID: 1961; Plant No.: 18379	1.9	<0.01	0.01
Coleman Road	2.1	0.05	N/A
Cumulative	≤14.2	≤0.12	≤0.03
BAAQMD Thresholds of Significance	100	0.8	10.0
Exceeds Threshold?	*No*	*No*	*No*

NOTE: Refer to Appendix B (Health Risk Assessment)

[a] The results represent the cumulative health risks associated with construction of the Project and all other sources of TAC and $PM_{2.5}$ emissions within a 0.25-mile radius of the Project. The Chronic HI for Coleman Road is not available (N/A).
[b] Chances in 1 million.
[c] Concentrations are expressed as micrograms per cubic meter (µg/m^3).
[d] Hazard indices (HI) are dimensionless.

Implementation of Mitigation Measure 3.C-1a would reduce cancer risks from Project construction to below the applicable threshold by requiring use off-road diesel construction equipment compliant with U.S. EPA Tier 4 nonroad engine standards. In addition, implementation of Mitigation Measure 3.C-1b would ensure that there would be no significant toxic airborne risks associated with fugitive dust from mercury contaminated soils or sediment. The health risk impact would not be cumulatively considerable and the cumulative impact would be less than significant with mitigation.

Operation Health Risks

Future maintenance of the Project could include sediment removal and bank protection activities. Sediment removal is only anticipated to be needed periodically downstream of the Lake as currently occurs under the Stream Maintenance Program ~~once every ten years~~ and would only last a few weeks in duration. Bank repair and levee settlement adjustment are not anticipated and would only be conducted as necessary. Other operations would include limited landscaping maintenance operations, levee inspections, and the operation of electric water pumps. Maintenance activities would occur rarely and for short durations that would not generate substantial TAC emissions. Other operations would result in the production of TAC emissions, or associated health risks from the Project's operation. Therefore, this impact is considered less than significant.

Mitigation Measures

Implement Mitigation Measures 3.C-1a and 3.C-1b.

Impact Significance after Mitigation: Less than Significant. The District and contractors would implement Mitigation Measures 3.C-1a (U.S. EPA Tier 4 Engines) which requires the use of cleaner burning engines which would reduce TAC emissions below the established threshold and Mitigation Measure 3.C-1b (BAAQMD Basic Construction Measures) to minimize the generation and emission of dust during construction.

Impact 3.C-4: The Project would not result in emissions that lead to odors affecting a substantial number of people. (Less than Significant)

Construction Emissions

The BAAQMD has developed a list of recommended odor screening distances for specific odor sources. If a proposed project would include the operation of an odor source, the screening distances should be used to evaluate the impact to existing sensitive receptors. The BAAQMD recommends that the screening distances be used as indicators to how much additional analysis would be required rather than the sole indicator of impact significance (BAAQMD, 2010). Off-road equipment and heavy duty trucks that would be used to construct the Project may generate emissions that lead to odors associated with combustion of diesel fuel. However, the BAAQMD does not have an odor screening distance for construction activity, and thus this methodology cannot be relied upon for this impact. As described in the

Environmental Setting section above, there are sensitive receptors (e.g., residences, schools) in the immediate vicinity of the Project site.

Diesel construction emissions from the Project would be temporary, intermittent in nature, and spatially dispersed, and therefore associated odors would dissipate quickly. Odor impacts associated with diesel combustion during construction activities would be less than significant.

When the lake is drained during construction, organic materials would be temporarily exposed to the air. However, these are not anticipated to result in substantial emission of odors, because water levels would be drawn down below the organic layer on the lake bottom, allowing sediments to partially dry out, rather than stagnate and generate odors. Also, construction activities would result in the removal and/or covering of this layer as a facet of the Project, which would be completed early during the construction period, after the removal of water from the lake is complete. As a result, this impact is considered less than significant.

Operations Emissions

Operation of the Project would include management of the lake, including pumping needed to maintain lake levels, and periodic sediment removal, maintenance of landscaping, and other facilities. Pumping and periodic maintenance would not produce objectionable odors. The Project would generally improve water quality within the lake, resulting in reduced potential for in-lake processes to generate odors, in comparison to existing conditions. Therefore, operation of the Project is not expected to increase objectionable odors, and this impact is considered less than significant.

Mitigation Measures

None required.

3.C.5 References

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3.D Biological Resources

This section addresses effects to biological resources that may result from implementation of the Project. Analysis of biological resources addresses habitats within the Project footprint and adjacent habitats outside of these boundaries and uses the term "Study Area" to describe all of Almaden Lake and Park, small portions of Alamitos Creek and Guadalupe Creek, and upland staging areas. In instances where only the Project footprint is referenced, the term "Project site" is used within this section. The resources described in this section include vegetation communities, such as freshwater marsh and willow scrub; lacustrine; and mixed riparian forest and associated wildlife, wetlands, and special-status plants and wildlife (federal or state endangered, threatened, proposed, and candidate species; and state or local species of concern). Fisheries resources are addressed in Section 3.E.

As part of this analysis, this section identifies the federal, state, and local regulations pertaining to biological resources in the Study Area and the region. Information used in the preparation of this chapter was obtained from the California Department of Fish and Wildlife's (CDFW's) California Natural Diversity Database (CDFW, 2018a; 2019b), California Native Plant Society (CNPS) Electronic Inventory (CNPS, 2019), U.S. Fish and Wildlife Service (USFWS) list of federally threatened and endangered species known to occur in the Study Area (USFWS, 2019), a reconnaissance-level field survey conducted by ESA biologist Elizabeth Hill on November 10, 2015 (ESA, 2015), wetland delineations conducted by ESA biologists Stephanie Bishop and David Rodriguez on December 1, 2015 and May 24, 2016 (see Appendix C), Santa Clara Valley Water District technical memorandums pertaining to the Study Area, and standard biological literature.

3.D.1 Environmental Setting

Regional Setting

The Study Area is in the 170 square-mile Guadalupe River Watershed, less than two-miles northeast of the Santa Cruz Mountains and less than 15 miles south of the San Francisco Bay estuary. The Santa Cruz Mountains are part of California's Coast Range and separate the San Francisco Bay Area from the Pacific Ocean along most of the San Francisco Peninsula. While much of the Coast Range remains undeveloped, the majority of the flat floodplain, including the Study Area, has been heavily urbanized (see Figure 2-1). Almaden Lake and its surrounding City parklands are in a residential neighborhood of San José, adjacent to Boulder Ridge Golf Club and near Guadalupe Oak Grove Park. An open space corridor characterized by oak woodland and grassland, located adjacent to the Study Area, extends from outside the Study Area, southeast, connecting the Santa Teresa hills and Santa Cruz Mountains. Further to the west, Guadalupe Creek flows from the Santa Cruz Mountain foothills to just north of Almaden Lake, while Alamitos Creek flows from the Santa Teresa hills into Almaden Lake from the south. Almaden Lake was created from a quarry site on Alamitos Creek. The confluence of Alamitos Creek with Guadalupe Creek, north of Almaden Lake, creates the Guadalupe River, which flows into San Francisco Bay approximately 20 miles downstream. Over time, both creeks have been heavily modified by urbanization.

Project Setting

Upland vegetation in the Study Area is generally landscaped or consists of nonnative grass, and a mix of native and nonnative shrub and tree species. The following descriptions provide further detail on the distinct habitat types and/or vegetation communities that can be found in the Study Area. These include: landscaped/developed, lacustrine, freshwater marsh and willow scrub, mixed riparian forest, and riverine (Figure 3.D-1a and Figure 3.D-1b). While these habitats exist in a continuum and can be interwoven, they are each a distinct habitat type with specific characteristics and jurisdictional implications.

Vegetative Communities and Wildlife Habitat Types

Lacustrine

The waters of Almaden Lake are characterized as lacustrine habitat, which is defined as portions of permanent bodies of water that do not support emergent vegetation and that are not subject to tidal exchange. The steep banks of the lake preclude the establishment of wetland vegetation around much of the lake, as is typical of naturally formed lakes. Almaden Lake occupies approximately 32 acres of the overall 65-acre Almaden Lake Park.

The lake provides seasonal foraging opportunities and cover for waterbirds such as gull (*Larus* sp.), mallard (*Anas platyrhynchos*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), great blue heron (*Ardea herodias*), common merganser (*Mergus merganser*), common moorhen (*Gallinula chloropus*), American coot (*Fulica americana*), double-crested cormorant (*Phalacrocorax auritus*), pied-billed grebe (*Podilymbus podiceps*), and Canada goose (*Branta canadensis*); in addition to other birds including red-winged blackbird (*Agelaius phoeniceus*), tree swallow (*Tachycineta bicolor*), violet-green swallow (*Tachycineta thalassina*), and northern rough-winged swallow (*Stelgidopteryx serripennis*). Western pond turtle (*Actinemys marmorata* also referred to as *Emys marmorata*), a California Species of Special Concern, are known to occur in lake waters. Fish species that may be present in the lake are addressed in Section 3.E.

Although the lake provides habitat for birds, it provides adverse conditions for most aquatic species. Mercury-laden sediment from historic upstream mining is deposited in the lake, where the depth of the lake, seasonal stratification, and nutrient enrichment contribute to the methylation of mercury and other negative water quality conditions. Methylmercury is a strong neurotoxin that has bioaccumulated in Almaden Lake's fish, aquatic organisms, and wildlife that feed on them. In addition, the lake has high concentrations of coliform bacteria and is subject to seasonal blue-green algae blooms that degrade habitat for aquatic organisms and wildlife in and around the lake as well as those downstream in the Guadalupe River.



SOURCE: Imagery (MapBox), 2018; ESA, 2020

Almaden Lake Improvement Project . 130679

Figure 3.D.1a (Revised)
Vegetation Communities and Habitat Types in the Project Study Area



SOURCE: Imagery (MapBox), 2018; ESA, 2020

Almaden Lake Improvement Project . 130679

Figure 3.D.1b (Revised)
Vegetation Communities and Habitat Types in the Project Study Area

Landscaped/Developed

Maintained turf of Bermuda grass (*Cynodon dactylon*), recreational trails (paved and unpaved), roadways, and parking lots have been established in the majority of the Study Area, which do not support high quality vegetation or wildlife habitat. The Park also includes land that has been disturbed from historical quarry practices and has been reclaimed by grading, planted with turf grass species, and/or planted at a low to moderate density with native and nonnative ornamental shrubs and trees. Irrigation has been applied to the majority of the landscaped areas to encourage the establishment of planted trees and shrubs. Native vegetation species found in this community include western sycamore (*Platanus racemosa*), coast live oak (*Quercus agrifolia*), valley oak (*Quercus lobata*), and toyon (*Heteromeles arbutifolia*); while the majority of the vegetation consists of nonnative species such as blue gum (*Eucalyptus globulus*), red iron bark (*Eucalyptus sideroxylon*), Peruvian pepper (*Schinus molle*), maidenhair tree (*Gingko biloba*), and Mexican fan palm (*Washingtonia robusta*). The District has made efforts to remove invasive giant reed (*Arundo donax*) from the lake island and plant riparian vegetation; however, the presence of giant reed remains. Similarly, developed areas have been subject to intense or recurring disturbance, generally through soil compaction, paving, removal or alteration of native vegetation, or effects from historic quarry operations or maintenance operations. Generally, plant cover in these areas is scarce due to the lack of topsoil; however, the limited amount of vegetation present can be characterized by a small number of weedy and/or native plant species including yellow star thistle (*Centaurea solstitialis*), coyote brush (*Baccharis pilularis*), chamise (*Adenostoma fasciculatum*), wild oats (*Avena fatua*), and sweet fennel (*Foeniculum vulgare*).

Common avian wildlife found in landscaped and developed communities include Canada geese, western gulls (*Larus occidentalis*), red-breasted sapsucker (*Sphyrapicus ruber*), acorn woodpecker (*Melanerpes formicivorus*), western scrub-jay (*Aphelocoma californica*), yellow-rumped warbler (*Setophaga coronata*), mourning dove (*Zenaida macroura*), northern mockingbird (*Mimus polyglottos*), house finch (*Haemorhous mexicanus*), and lesser goldfinch (*Spinus psaltria*). Mammals commonly associated with the residential neighborhood surrounding the Study Area, include California ground squirrel (*Otospermophilus beecheyi*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), and common bats, such as Mexican free-tailed bat (*Tadarida brasiliensis*) and Yuma myotis (*Myotis yumanensis*). Western fence lizard (*Sceloporus occidentalis*) is also common in landscaped and developed areas.

Freshwater Marsh and Willow Scrub

Freshwater marsh is the predominant vegetation type occurring on the fringes of Almaden Lake, including the island, Alamitos Creek~~,~~ and Guadalupe Creek~~, and Guadalupe River~~. This community is also found along the fringes of the peninsula gravel bar in the southern portion of Almaden Lake. It is dominated by herbaceous wetland plants including narrowleaf cattail (*Typha angustifolia*) and hardstem bulrush (*Schoenoplectus acutus*), and woody plants including mulefat (*Baccharis salicifolia*). Willow (*Salix* spp.) dominates the vegetation found on the lake island and can be found along the lake fringe with spearmint (*Mentha spicata*); otherwise, the lake fringe is mostly devoid of vegetation, except for the area in

proximity to the mixed riparian forest (discussed below). Narrow bands of freshwater emergent wetland/willow scrub also occur along Alamitos Creek and include willow, mugwort (*Artemisia douglasiana*), and fringed willowherb (*Epilobium ciliatum*).

Great egrets, snowy egrets, and black-crowned night herons (*Nycticorax nycticorax*) have been observed nesting on the lake island while green herons (*Butorides virescens*) and Forster's tern (*Sterna forsteri*) are also known to nest in vegetation on the island and east side of the lake (Santa Clara Valley Audubon Society, 2014; Strong et al., 2004). Other species with the potential to migrate through, nest, or forage on the lake island include, spotted sandpiper (*Actitis macularius*), great-tailed grackle (*Quiscalus mexicanus*), and reptiles and amphibians such as western pond turtle, California toad (*Anaxyrus boreas halophilus*) and Sierran tree frog (*Pseudacris sierra*) (SCVAS, 2005).

Mixed Riparian Forest

Along Alamitos Creek and Guadalupe Creek, mixed riparian forest occurs from the edge of the creek to the upper banks. The riparian area is dominated by tall trees and some shrubs and herbs including, coyote brush, smilo grass (*Stipa miliacea*), Himalayan blackberry (*Rubus armeniacus*), sweet fennel, western sycamore, coast live oak, and Fremont cottonwood (*Populus fremontii*). Wildlife associated with this habitat include red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter cooperii*), belted kingfisher (*Megaceryle alcyon*), black phoebe (*Sayornis nigricans*), killdeer (*Charadrius vociferus*), western kingbird (*Tyrannus verticalis*), Bullock's oriole (*Icterus bullockii*), Vaux's swift (*Chaetura vauxi*), Anna's hummingbird (*Calypte anna*), common starling (*Sturnus vulgaris*), Lincoln's sparrow (*Melospiza lincolnii*), and song sparrow (*Melospiza melodia*).

Riverine

Alamitos Creek~~,~~ and Guadalupe Creek~~, and Guadalupe River~~ are all perennial freshwater streams within the Study Area, classified as riverine habitat (Cowardin, et al, 1979) and jurisdictional Waters of the U.S. and of the state (ESA, 2016). The Project's riverine habitat occurs in association with the adjacent riparian habitat, and is contiguous to the lacustrine and fresh emergent wetland habitat. Water moss and algae are often found on and beneath the rocks in this community. Insects characteristically inhabit the riverine habitat, which also provides habitat for wildlife occurring in open water zones. In addition, waterbirds, insectivorous birds (swallows, swifts, flycatchers) and mollusks are commonly found in this community. See Section 3.E regarding fish species present within the Project's riverine habitat.

Special-Status Species

A number of species known, or with potential, to occur in the Study Area vicinity are protected pursuant to federal and/or State endangered species laws, or have been designated Species of Special Concern by the CDFW. In addition, Section 15380(b) of the California Environmental Quality Act (CEQA) *Guidelines* provides a definition of rare,

endangered or threatened species that are not included in any listing.[1] Species recognized under these terms are collectively referred to as "special-status species." For the purposes of this EIR, special-status species include:

1. Species listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (50 CFR 17.12 [listed plants], 17.11 [listed animals], and various notices in the Federal Register [FR] [proposed species]);
2. Species that are candidates for possible future listing as threatened or endangered under the federal Endangered Species Act (61 FR 40, February 28, 1996);
3. Species listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (14 Cal. Code Regs. 670.5);
4. Species formerly designated by the USFWS as species of concern or species designated by the CDFW as Species of Special Concern;[2]
5. Species designated as "special animals" by the state;[3]
6. Species designated as "fully protected" by the state (there are about 35, most of which are also listed as either endangered or threatened);[4]
7. Raptors (birds of prey), which are specifically protected by California Fish and Game Code Section 3503.5, thus prohibiting the take, possession, or killing of raptors and owls, their nests, and their eggs;[5]
8. Plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code, Section 1900 et seq.);
9. Species that meet the definitions of rare and endangered under CEQA. CEQA Section 15380 provides that a plant or animal species may be treated as "rare or endangered" even if not on one of the official lists (CEQA Guidelines, Section 15380); and

[1] For example, vascular plants listed as rare or endangered or as List 1 or 2 by CRPR are considered to meet Section 15380(b).

[2] A California Species of Special Concern is one that: has been extirpated from the state; meets the state definition of threatened or endangered but has not been formally listed; is undergoing or has experienced serious population declines or range restrictions that put it at risk of becoming threatened or endangered; and/or has naturally small populations susceptible to high risk from any factor that could lead to declines that would qualify it for threatened or endangered status.

[3] Species listed on the current CDFW "special animals" list (November 2018), which includes 904 species. This list includes species that CDFW considers "those of greatest conservation need." (CDFW, 2019)

[4] The "fully protected" classification was California's initial effort in the 1960s to identify and provide additional protection to those animals that were rare or faced possible extinction. The designation can be found in the Fish and Game Code.

[5] The inclusion of birds protected by Fish and Game Code Section 3503.5 is in recognition of the fact that these birds are substantially less common in California than most other birds, having lost much of their habitat to development, and that the populations of these species are therefore substantially more vulnerable to further loss of habitat and to interference with nesting and breeding than most other birds. It is noted that a number of raptors and owls are already specifically listed as threatened or endangered by State and federal wildlife authorities.

10. Plants considered to be "rare, threatened or endangered in California" under the California Rare Plant Ranking system (CRPR) which include Rank 1A, 1B, 2A, and 2B as well as Rank 3 and 4[6] plant species.

Appendix C provides a list of the special-status species (and their regulatory status) that have been documented in the nine U.S. Geological Survey (USGS) quadrangles covering and surrounding the Study Area and that, therefore, have the potential to occur in the Project location and may be affected by the Project. This list was obtained from the California Natural Diversity Database (CDFW, 2020 ~~2019b~~)[7], CNPS Electronic Inventory (CNPS, 2019), and the USFWS (2019). Based on a review of the biological literature of the region, recent biological reports for the Study Area, and an evaluation of the Study Area's habitat conditions (ESA, 2015), ESA determined whether each species has a low, moderate, or high potential to occur in the Study Area.

Species with a low potential to occur are species whose current distribution or range does not include the Study Area, or species whose specific habitat requirements (e.g., tidal salt marsh) are not present. Species with a moderate potential to occur are those for whom suitable foraging or breeding habitat is present in the Study Area, even though the species has not been recently observed in the Study Area. A species was determined to have a high potential for occurrence if moderate to high quality habitat is present within the Study Area in addition to the area being included in the documented range of the species. Species observed or with a moderate to high potential to occur within the Study Area are discussed in detail below. Species documented by the CNDDB within three miles of the Study Area are shown in Figure 3.D-2.

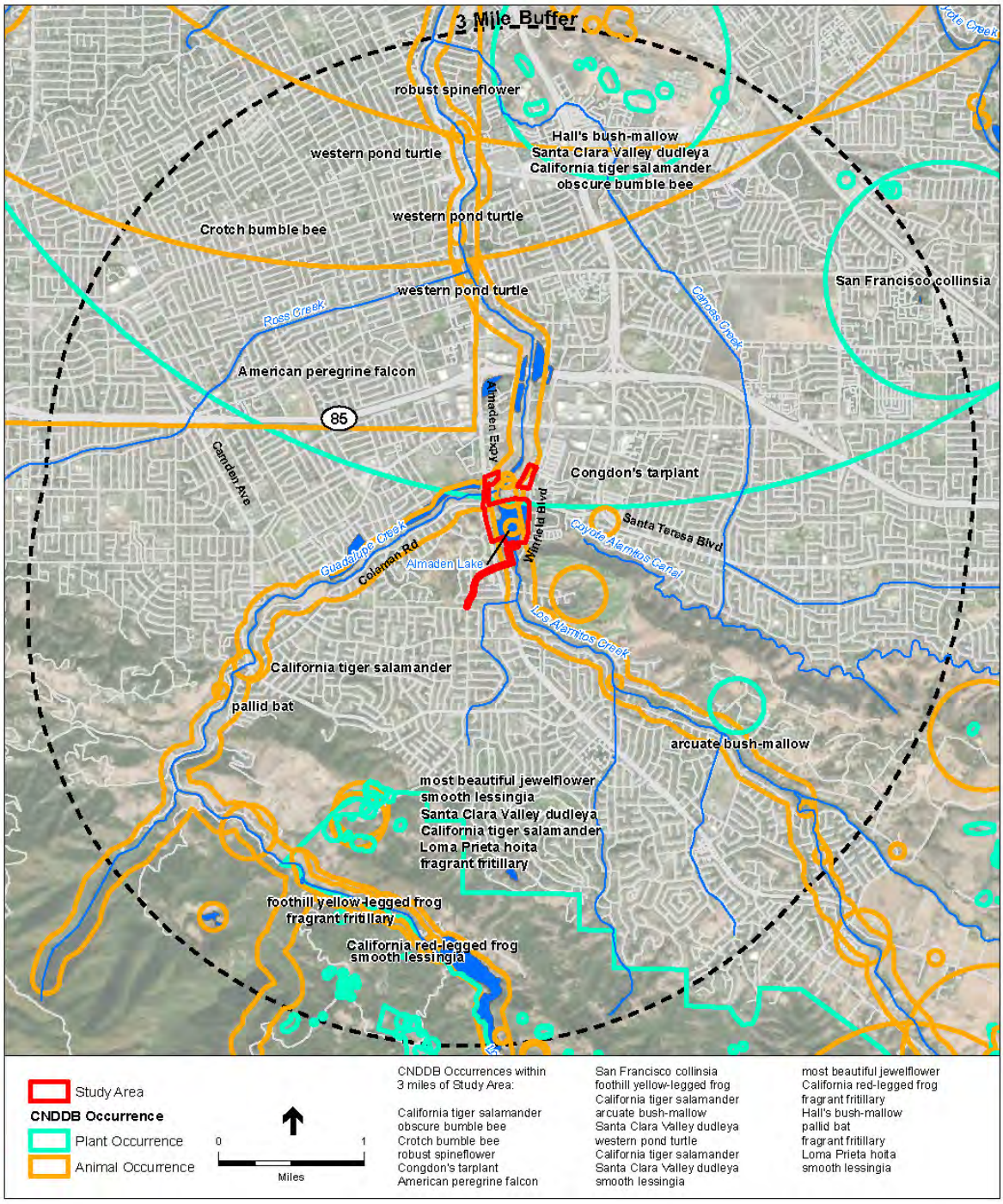
Species Assessed in Detail

Of the special-status plants and animals presented in Appendix C, only the following species have a moderate to high potential to occur within the Study Area and are described in detail below:

- herons and egrets nesting colonies
- Double-crested cormorant nesting colonies
- Tricolored blackbird
- Cooper's hawk
- Western pond turtle
- California red-legged frog
- Foothill yellow-legged frog
- Hoary bat
- Yuma myotis

[6] Rank 3 plants may be analyzed under CEQA Guidelines Section 15380 if sufficient information is available to assess impacts to such plants. Factors such as regional rarity vs. statewide rarity should be considered in determining whether cumulative impacts to a Rank 4 plant are significant even if individual project impacts are not. CRPR Rank 3 and 4 may be considered regionally significant if, e.g., the occurrence is located at the periphery of the species' range, or exhibits unusual morphology, or occurs in an unusual habitat/substrate. For these reasons, CRPR Rank 3 and 4 plants should be included in the special-status species analysis. Rank 3 and 4 plants are also included in the CNDDB Special Vascular Plants, Bryophytes, and Lichens List. The current online published list is available at: http://www.dfg.ca.gov/biogeodata (CDFW, 2019a).

[7] The CNDDB was reviewed in April 2021 and no new wildlife or plant occurrences within the Study Area were documented since the publishing of the project's Draft EIR.



Almaden Lake Improvement Project . 130679

SOURCE: CDFW, 2020

Figure 3.D-2 (Revised)
CNDDB Species in the Project Area

Special-Status Plants

Thirty special-status plant species have been documented in the nine quadrangles covering and surrounding the Study Area (CDFW, 2020 ~~2019b~~; CNPS, 2019; USFWS, 2019) (see Appendix C), but none have been documented in the Study Area. Due to the historical industrial operations, development, and ongoing intensive human use of the Study Area, which have eliminated suitable habitat, no special-status plants are expected to occur in the Study Area and none were observed during the reconnaissance level field survey and wetland delineations conducted for this Project.

Special-Status Animals

Forty-one special-status animal species have been documented in the nine quadrangles covering and surrounding the Study Area (CDFW, 2020 ~~2019b~~; CNPS, 2019; USFWS, 2019), see Appendix C. Five of these are fish species discussed in Section 3E. Due to the historical industrial operations, development, and ongoing intensive human use of the Study Area, few special-status animals have the potential to occur in the Study Area, as noted above and discussed further below.

Amphibians

California red-legged frog (*Rana draytonii*). The California red-legged frog is listed as federally threatened and as a California Species of Special Concern. The Study Area does not occur within the USFWS-designated critical habitat for this species (USFWS, 2010). California red-legged frog reside in lowlands and foothills in or near permanent or semi-permanent water sources, such as lakes, stock ponds, and slow moving streams with deep pools and dense shrubs or emergent aquatic vegetation. Where water sources are not permanent, California red-legged frogs require access to dry-season upland aestivation habitat in the form of mammal burrows, soil cracks, or moist understory vegetation. Red-legged frogs require at least 11 weeks of permanent water after egg laying for larval development.

The nearest occurrence of the California red-legged frog is less than three miles away from the Study Area, in the vicinity of Guadalupe Reservoir. It would be difficult for California red-legged frog to disperse through the Study Area because it is dominated by heavily trafficked roads and human disturbance originating from Almaden Lake Park and the surrounding residential area, and operations and maintenance over the years within the Alamitos Creek corridor within Almaden Lake Park. Furthermore, due to alterations of natural habitat, the increased presence of nonnative predatory fish lowers the likelihood of California red-legged frog to occur within the immediate area of the lake. The species was not observed during the reconnaissance level field survey and wetland delineations conducted for this Project. However, the species still has the potential to use the riparian areas of Alamitos Creek and Guadalupe Creek outside of the Park boundaries but within the Study Area.

Foothill yellow-legged frog (*Rana boylii*). Foothill yellow-legged frog is a California Endangered Species Act (CESA) state candidate for listing as Threatened and is currently a California Species of Special Concern found in or near shallow, flowing water in small to

moderate-sized streams with at least some cobble sized substrate (Hayes and Jennings 1988), including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow types. Unlike most other *Ranid* frogs in California, this species is rarely encountered far from permanent water. Foothill yellow-legged frogs hunt aquatic, terrestrial, and flying invertebrates, spiders, and grasshoppers, and seek refuge in between rocks or leaf litter at the bottom of stream or creek beds when threatened (Nafis, 2015). Breeding and egg laying usually occur at the end of spring flooding and may commence any time from mid-March to May, depending on local water conditions (CDFG, 2000). Female frogs use the downstream side of rocks as protection for egg masses that are attached to pebbles, rocks, or submerged vegetation (Nafis, 2015). The foothill yellow-legged frog's historic range is in the Coast Ranges from the Oregon border south to the Transverse Mountains in Los Angeles County, in most of northern California west of the Cascade crest, and along the western flank of the Sierra south to Kern County. The nearest occurrence of the foothill yellow-legged frog to the Study Area was documented less than three miles away in the Rancho del Guadalupe area, downstream from Guadalupe Reservoir. The species was not observed during the reconnaissance level field survey and wetland delineations conducted for this Project. Suitable habitat for this species occurs in Alamitos and Guadalupe creeks; however, the presence of nonnative predatory fish has limited the likelihood of the presence of foothill yellow-legged in Almaden Lake.

Reptiles

Western pond turtle. The western pond turtle is a California Species of Special Concern. It inhabits rivers, streams, natural and artificial ponds, and lakes. Two subspecies are recognized, the northwestern pond turtle that inhabits San Francisco Bay and to the north, while the southern western pond turtle is found south of San Francisco Bay (Lovich, n.d.). Optimal habitat seems to be characterized by the presence of adequate emergent basking sites, emergent vegetation, and the presence of suitable refugia in the form of undercut banks, submerged vegetation, mud rocks and logs (Holland, 1994). Adjacent terrestrial habitat is also critical for egg laying, winter refuge, and dispersal. Western pond turtles eat a wide variety of food items including, algae, various plants, snails, crustaceans (Lovich, n.d.). The species was not observed during the reconnaissance level field survey and wetland delineations conducted for this Project. While~~,~~ this species is known to occur in ~~the~~ Guadalupe River north ~~portion~~ of the Study Area (CDFW, 2020 ~~2019b~~), in the main channel~~,~~ approximately 0.2 mile downstream of Almaden Expressway bridge, nonnative predatory fish and competition from nonnative turtles, such as red-eared slider (*Trachemys scripta elegans*) and yellow bellied slider (*Trachemys scripta scripta*) could limit the occurrence of western pond turtle within the Study Area.

Birds

Tricolored blackbird (*Agelaius tricolor*). Tricolored blackbirds, listed as a California Species of Special Concern, are common throughout the Central Valley and coastal areas south of Sonoma County. The species breeds near fresh water, preferring emergent wetlands with tall, dense cattails or tules, but also in thickets or willow and blackberry. As described in the

Santa Clara Valley Habitat Plan (SCVHP), urban wetlands and upland foraging habitats, such as those in the Study Area, may continue to accommodate tricolored blackbird breeding and foraging habitat (SCVHA 2012). Tricolored blackbirds feed in grassland and cropland habitats, and nests are usually located near fresh water, as well as hidden on the ground among low vegetation. Nest areas must be large enough to support a minimum of about 50 pairs (Grinnell and Miller, 1944). Research indicates black-crowned night heron nest predation of tricolored blackbirds is a threat to the species reproductive success and often causes significant losses of eggs and nestlings in colonies located in emergent wetland vegetation (Beedy, Sanders, and Bloom 1991). If tricolored blackbird nests are present, the likelihood of nest loss from predation remains an existing feasible threat. The nearest CNDDB occurrence of tricolored blackbird is over five miles south of the Study Area, near Calero Reservoir. The species was not observed during the reconnaissance level field survey and wetland delineations conducted for this Project. Although there is ongoing high levels of human disturbance and potential threat of nest predation in the Study Area, habitat that could support tricolored blackbird nesting colonies occurs within the Study Area.

Double-crested cormorant. Nesting colonies for the double-crested cormorant are on the CDFW Watch List and have previously been listed as a California Species of Special Concern. A yearlong resident along the entire coast of California, the species is fairly common to locally very common along the coast and in fresh water ponds, estuaries and salt ponds. The species forages mainly on fish, crustaceans, and amphibians. It sometimes feeds cooperatively in flocks of up to 600, often with pelicans, and nests in colonies of a few to hundreds of pairs (Zeiner et al., 1990). Double-crested cormorants require undisturbed nest-sites adjacent to water, on islands or mainland. Double-crested cormorants have been observed in Almaden Lake and on the island, but have not been recently documented nesting in the Study Area.

Herons and Egrets. Nesting colonies of great egret, great blue heron, snowy egret, and black-crowned night-herons are all listed on the CDFW Special Animals list (CDFW, 2018a). Herons and egrets depend on large trees, dense types of vegetation, and man-made structures by tidal marsh, tidal mudflats, and non-tidal wetlands for nesting in spring and summer and for feeding year-round (PRBO, 2011). Important feeding sites also include creeks and ponds where they feed upon fish, small mammals, and invertebrates. Nest predation of herons and egrets is common among raccoons, feral cats, or ravens. As of 2014, snowy egret, great egret, and black-crowned night heron have been observed to nest on the island, while great blue heron have been known to nest on the island within the last seven years (SFBBO, 2013 and SFBBO, 2014; SCVAS, 2005).

Cooper's hawk (*Accipiter cooperi*). Nesting Cooper's hawks are on the CDFW Watchlist and are protected under Section 3503.5 of the California Fish and Game Code. Cooper's hawks range over most of North America and may be seen throughout California, most commonly as a winter migrant. Nesting pairs have declined throughout the lower-elevation, and more populated parts of the state. Cooper's hawk generally forage in open woodlands and wooded margins and nests in tall trees, often in riparian areas, such as those present in the Study Area. Cooper's hawk is known to nest locally in Bay Area urban neighborhoods. The species

was not observed during the reconnaissance level field survey and wetland delineations conducted for this Project. The nearest CNDDB occurrence is documented less than five miles northwest of the Study Area.

Other Breeding and Migratory Birds. The Study Area provides habitat for several species of birds, with some species as year around residents, and others passing through along the Pacific Flyway during spring and fall migrations. Trees, shrubs, and banks of the creeks, rivers, and lake island within the Study Area provide habitat for a variety of birds, including green heron, red-tailed hawk, and red-shouldered hawk, as well as patches of habitat for potential use by migrants as stop-over sites. Several passerine species which readily utilize urban landscaping for nesting could also potentially nest in the Study Area.

As discussed below under the Regulatory Setting, most migratory birds are protected from harm by the federal Migratory Bird Treaty Act (MBTA) and most breeding birds in California are protected under the California Fish and Game Code (Section 3503).

Mammals

Special-status Bat Species. Underutilized buildings, bridges, or tree crevices in the project's Study Area may be potential roosting habitat for two Western Bat Working Group (WBWG)[8] priority bat species: Yuma myotis, Low-Medium Priority species, and hoary bat (*Lasiurus cinereus*), a WBWG Medium Priority species.

There were no signs of bat roosts, such as observations of actual bats, bat guano, bat urine staining, or sounds of roosting bats, in trees or buildings on the Project site during the November 10, 2015 reconnaissance survey performed by ESA (ESA, 2015). Despite the high-levels of human disturbance in the Study Area and distance to known occurrences, suitable roosting habitat for these bats could be found on man-made structures including the Coleman Road Bridge and culverts, in tree foliage, underneath the exfoliating bark of trees, and in tree cavities. The nearest occurrence of Yuma myotis is south of New Almaden, approximately six miles to the southeast of the Study Area. The nearest occurrence of the hoary bat is in San José, although, the exact location is undocumented.

Sensitive Natural Communities

Sensitive natural communities are designated as such by various resource agencies, such as the CDFW, or in local policies and regulations, and are generally considered to have important functions or values for wildlife and/or are recognized as declining in extent or distribution, and are considered threatened enough to warrant some sort of protection. For example, many local agencies in California consider protection of oak woodlands important, and federal, state, and most local agencies also consider wetlands and riparian habitat as sensitive communities. CDFW tracks communities it believes to be of conservation concern

[8] The Western Bat Working Group (WBWG) is comprised of agencies, organizations and individuals interested in bat research, management and conservation from the 13 western states and provinces. One of WBWG's goals is to facilitate communication among interested parties and reduce risks of species decline or extinction. The WBWG status of bat species is provided on the CNDDB Special Animals List. Taxa on these lists are reviewed for inclusion in the CNDDB Special Animals List, but are not automatically included.

through its List of California Terrestrial Communities and the CNDDB, and these communities are typically considered special-status for the purposes of CEQA analysis. Due to the developed nature of the Study Area as described above, no terrestrial sensitive or special-status natural communities, other than riparian areas (discussed above), are present (CDFW, 2018b).

Wetlands and Other Jurisdictional Waters

ESA conducted a wetland delineation of the Study Area on December 1, 2015 and May 24, 2016 (see Appendix C). A total of 32.48 acres (1,414,829 square feet) of potentially jurisdictional Waters of the U.S[9]. were documented within the delineation Study Area which includes Alamitos Creek, Almaden Lake, Guadalupe Creek, and Guadalupe River.

3.D.2 Regulatory Setting

This subsection briefly describes federal, state, and local regulations, permits, and policies pertaining to biological resources and wetlands as they apply to the Project.

Federal Regulations

Federal Endangered Species Act

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 United States Code [USC] 1533(c)). Pursuant to the requirements of FESA, a federal agency reviewing a proposed project within its jurisdiction must determine whether any federally listed threatened or endangered species may be present in the project area and determine whether the proposed project may affect or "take" such species. In addition, the agency is required to consult with the USFWS and/or the National Marine Fisheries Service (NMFS) to determine whether the project is likely to jeopardize the continued existence of any species listed under FESA or result in the destruction or adverse modification of critical habitat (see below) designated for such species (16 USC 1536(3)). Consultation with either the USFWS or NMFS would be required for the project since the U.S. Army Corps of Engineers (Corps) will need to issue a permit for the project. During consultation, the potential for take would be determined and, if take is expected to occur, the necessary conditions to allow the issuance of an incidental take permit would be imposed.

Areas of habitat considered essential to the conservation of a listed endangered or threatened species may be designated as critical habitat, which is protected under FESA. There is no critical habitat designated in the Study Area.

Federal Migratory Bird Treaty Act

The federal MBTA (16 USC, Section 703, Supp. I, 1989) prohibits pursuit, take or attempt to take, killing, possessing, selling, or trading in migratory birds except in accordance with

[9] Existing Waters of the State are the same as Waters of the U.S. in the Project footprint.

regulations prescribed by the Secretary of the Interior. This act applies to whole birds, parts of birds, and bird nests and eggs. On December 22, 2017, the U.S. Department of the Interior redefined "incidental take" under the MBTA such that, "the MBTA's prohibition on pursuing, hunting, taking, capturing, killing, or attempting to do the same applies only to direct and affirmative purposeful actions that reduce migratory birds, their eggs, or their nests, by killing or capturing, to human control" (USDOI, 2017).[10] The USFWS subsequently provided similar guidance on April 11, 2018 (USFWS, 2018). Thus, the federal MBTA definition of "take" does not prohibit or penalize the incidental take of migratory birds that results from actions that are performed without motivation to harm birds. This interpretation differs from the prior federal interpretation of "take", which prohibited all incidental take of migratory birds, whether intentional or incidental.

Birds that are covered by provisions of the MBTA and could be expected to be present in the Study Area include the green heron, black-crowned night heron, Cooper's hawk, red-tailed hawk, among others.

Federal Clean Water Act

Section 404 of the Clean Water Act (CWA) regulates Waters of the U.S., which includes wetlands and other waters of the U.S. For purposes of federal jurisdiction, wetlands are "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support (and do support, under normal circumstances) a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3[b] and 40 CFR 230.3). Under normal circumstances, the federal definition of wetlands requires three wetland identification parameters be present: wetland hydrology, hydric soils, and hydrophytic vegetation. Examples of federally jurisdictional wetlands include freshwater marsh, seasonal wetlands, and vernal pool complexes that have a hydrologic link to other Waters of the U.S. (see definition below for "other Waters of the U.S."). The Corps is the responsible agency for Section 404 of the CWA, while the U.S. Environmental Protection Agency (USEPA) has overall responsibility for the CWA. As discussed in more detail below, the Regional Water Quality Control Board (RWQCB) regulates Waters of the U.S. under Section 401 of the CWA.

Section 404 of the federal CWA (33 U.S.C. 1251–1376) prohibits the discharge of dredged or fill material into Waters of the U.S., including wetlands, without a permit from the Corps. Section 401 of the CWA requires that Corps-permit applicants also obtain state certification that the activity associated with the permit will comply with applicable state effluent limitations and water quality standards.

In addition to wetlands, other waterbodies and features are regulated under federal and state law. "Other Waters of the U.S." refers to those aquatic features that are regulated by the CWA but are not wetlands, and are defined under the CWA at 33 CFR 328.4. Examples of

[10] Note that birds and their nests are separately protected by State law; specifically, Fish and Game Code sections 3503 and 3503.5, which respectively prohibit the unlawful destruction of nests and eggs; and the unlawful take of birds-of-prey or their eggs. Hence, the MBTA guidance does not alter the State protection of active bird nests and eggs.

"other Waters of the U.S." include rivers, creeks, intermittent and ephemeral channels, ponds, and lakes, such as Almaden Lake.

Prior to any creek diversion, draining of lake, levee construction, island creation and expansion, the Project would need to obtain necessary permits for these impacts, including a Section 404 of the CWA permit from the Corps and RWQCB Section 401 Water Quality Certification. Also see Section 3.K, Hydrology and Water Quality for further discussion on this topic.

State Regulations

California Endangered Species Act

Under the CESA, CDFW maintains a list of threatened species and endangered species (California Fish and Game Code Section 2070). CDFW also maintains a list of "candidate species," which are species that CDFW has formally recognized as being under review for addition to either the list of endangered species or the list of threatened species. CDFW also maintains lists of "Species of Special Concern." Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a significant impact on such species. In addition, CDFW encourages informal consultation on any proposed project that may affect a candidate species. During consultation, the potential for take would be determined and, if take is expected to occur, the terms of an incidental take permit would be developed.

California Fish and Game Code Sections 1602, 3503, 3511, 4150, 4700, 5050, and 5515

Under Sections 1600–1616 of the California Fish and Game Code, the CDFW regulates activities that would substantially divert, obstruct the natural flow of, or substantially change rivers, streams, and lakes through the issuance of a lake or Streambed Alteration Agreement (LSAA). The jurisdictional limits of the CDFW are defined in Section 1602 of the Fish and Game Code as the "bed, channel, or bank of any river, stream, or lake", although jurisdiction is often interpreted to include adjacent riparian vegetation as well. Activities that would "deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake" are prohibited by the CDFW unless a LSAA is issued. Any work within channels with a clear bed and banks, such as Alamitos Creek or Guadalupe Creek, falls under CDFW jurisdiction and requires a LSAA.

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.3 of the California Fish and Game Code prohibits take, possession, or destruction of any raptor (birds of prey) in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs. Any loss of fertile eggs or nesting raptors, or any activities resulting in nest abandonment, would constitute a significant impact.

The State Fish and Game Code Section 4150 states that all non-game mammals or parts thereof may not be taken or possessed except as otherwise provided in the code or in accordance with regulations adopted by the commission. This Section applies to all bat species.

CDFW Fully Protected Species may not be taken or possessed at any time without a permit from CDFW (Section 3511 Birds, Section 4700 Mammals, Section 5050 Reptiles and Amphibians, and Section 5515 Fish).

State Regulation of Wetlands and Other Waters

The State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCBs) (together "Boards") are the principal state agencies with primary responsibility for the coordination and control of water quality. Waters of the state of California are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code §13050(e)) and include all federally jurisdictional waters. Waters of the state are broadly construed to include both public and private waters in natural and artificial channels (SWRCB, 2008).

In the Porter-Cologne Water Quality Control Act (Porter-Cologne), the California Legislature declared that the "state must be prepared to exercise its full power and jurisdiction to protect the quality of the waters in the state from degradation..." (California Water Code §13000). Porter-Cologne grants the Boards the authority to implement and enforce the water quality laws, regulations, policies, and plans to protect the groundwater and surface waters of the state. The RWQCB has regulatory authority over wetlands, including those that are "isolated" and therefore not considered federally jurisdictional. Impacts to waters of the state require a project proponent to obtain a Waste Discharge Permit (for non-federally-jurisdictional waters) and/or a CWA Section 401 certification (for federally jurisdictional waters, as in the case of the required Corps permit). The enforcement of the state's water quality requirements is not solely the purview of the Boards and their staff. Other agencies (e.g., the CDFW) have the ability to enforce certain water quality provisions in state law. The Boards must certify that a Corps permit action meets state water quality objectives (CWA Section 401).

The State Water Resources Control Board (State Water Board) adopted a State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (Procedures), for inclusion in the forthcoming Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California. The Procedures consist of four major elements: (1) a wetland definition; (2) a framework for determining if a feature that meets the wetland definition is a water of the state; (3) wetland delineation procedures; and (4) procedures for the submittal, review and approval of applications for Water Quality Certifications and Waste Discharge Requirements for dredge or fill activities. The Office of Administrative Law approved the Procedures on August 28, 2019 and the Procedures ~~will be~~ became effective May 28, 2020, but were invalidated on procedural grounds in a December 2020 Sacramento Superior Court decision. On April 6, 2021, the State Water Board adopted a resolution approving the application of the Procedures as a water quality control policy. This resolution will allow the Board to directly apply the

Procedures to waters of the State based on its policy-making authority rather than the water quality control planning process. Thus, the Procedures will be applied to waters of the state in addition to waters of the United States.

The RWQCB Water Quality Control Plan for the San Francisco Bay Basin Plan is the San Francisco Bay RWQCB's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. Although Almaden Lake is generally referred to as a separate water body from Alamitos Creek, the lake is not listed in the Basin Plan. The beneficial uses of Alamitos Creek, including preservation of rare and endangered species (RARE) and wildlife habitat (WILD), apply to the lake because it is part of the creek. Resolution R2-2008-0089 established new water quality objectives, total maximum daily loads, and an implementation plan for mercury in the Guadalupe River Watershed, including the Study Area.

California Native Plant Protection Act

State listing of plant species began in 1977 with the passage of the California Native Plant Protection Act (NPPA), which directed CDFW to carry out the legislature's intent to "preserve, protect, and enhance endangered plants in this state." The NPPA gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to require permits for collecting, transporting, or selling such plants. The CESA expanded upon the original NPPA and enhanced legal protection for plants. The CESA established threatened and endangered species categories, and grandfathered all rare animals—but not rare plants—into the act as threatened species. Thus, there are three listing categories for plants in California: rare, threatened, and endangered.

Local Plans and Policies

Santa Clara Valley Habitat Plan

The Santa Clara Valley Habitat Plan (SCVHP) (SCVHA, 2012) provides a framework for promoting the protection and recovery of natural resources, including endangered species, while streamlining the permitting process for planned development, infrastructure, and maintenance activities. The SCVHP provides Endangered Species Act and California Endangered Species Act compliance for specific activities within the SCVHP area, which includes the Project area. The SCVHP is administered by the Santa Clara Valley Habitat Agency and is a regional partnership between six local partners (the County of Santa Clara, Santa Clara Valley Transportation Authority, Santa Clara Valley Water District, and the cities of San José, Gilroy, and Morgan Hill) and two Wildlife Agencies (CDFW and USFWS). The SCVHP identifies and preserves land that provides important habitat for endangered and threatened species. The land preservation is both to mitigate for the environmental impacts of planned development and public infrastructure operations and maintenance activities as well as to enhance the long term viability of endangered species. The SCVHP includes conditions on covered activities, to avoid and minimize take on covered species and to help meet goals for high quality regional habitat protection. Avoidance and minimization measures pertaining to specific relevant Conditions are referenced below.

City of San José Municipal Code

The City of San José provides for the protection of trees in the Municipal Code (Code) Sections 13.32 and 13.44.220. The Code outlines permit requirements for any tree-related work (removal, planting or pruning). Removal of trees from City of San José Parks Department jurisdiction requires the posting of a courtesy notice to the public and review by the City Arborist's Office (Code Section 13.44.220). The Study Area, outside the Parks Department jurisdiction, may support street trees considered protected in accordance with the San José Municipal Code.

13.28.310 - Pruning or removal of street tree - Permit required.

A. Except as provided in this section, it shall be unlawful for any person to prune or remove any street tree, or do any construction work or activity that may affect the critical root zone of a street tree, without a permit issued by the director.

B. Each permit to prune or remove a street tree shall contain the following information:

   1. Name of permit applicant;

   2. Time period in which to complete the action specified or required in the permit;

   3. Type and species of the replacement street tree to be purchased by permittee, at permittee's expense, and to be planted, if applicable;

   4. Description of the pruning, if applicable; and

   5. Location of removal of the street tree and replanting of the street tree or location of street tree to be pruned.

C. The director shall issue a permit to remove a street tree only if at least one of the following criteria is met:

   1. The street tree is in a hazardous condition or imminently hazardous condition.

   2. The type, species, or location of the street tree is in conflict with a community forest master plan adopted by the city council or the street tree policy, guidelines, and best practices published by the director.

   3. The street tree interferes with high tension electrical lines and the interference cannot be corrected by topping the street tree.

   4. The street tree has caused extensive concrete damage and the concrete has been replaced more than once in the preceding ten years.

   5. The street tree has done extensive sewer system damage that cannot be resolved by any other reasonable means.

   6. The street tree is in conflict with an approved development permit for the adjacent property or right-of-way pursuant to Title 20 of this Municipal Code.

13.44.220 - Damaging park property - Prohibited acts designated.

Unless authorized in writing by the director of the department of recreation, parks and community services to do so, no person shall:

A. Pick, saw, chop, carve, cut, remove or damage any flowers, seeds, bark, branches, twigs, leaves or blossoms of any tree, plant, shrub, vine, bush or other vegetation in any park of the city;

B. Drive any nail, screw, bolt or staple into, or attach any wire, rope or other fastening device to any tree or plant in any park of the city;

C. Mark, deface, damage, displace or remove any building, bridge, table, chair, bench, fireplace, barrier, fence, railing, paving or paving material, water pipe or light, or any sign, notice or placard, whether temporary or permanent, or any cultural, natural or historic artifact, or monument stake, post or other boundary marker, or any other structure, equipment, facility or property, or part or appurtenance thereof whatsoever, in or from any park of the city;

D. Cut or remove any sand, wood, turf, grass, gravel, stone or timber in or from any park of the city, or make any excavation by any tool, equipment, blasting or by any other means in any park of the city;

E. Paint, erect, mark, post or fasten on or to any tree, shrub, fence, wall, building, monument or other property in any park any poster, bill, advertisement, inscription, sign or display. The provisions of this subsection shall not apply to any such thing that is authorized or required to be so placed by the director;

F. Take or operate a vehicle upon or over any lawn or landscaping in any park of the city. City will determine repair or replacement costs in event of damage.

City of San José Envision Plan (2011)

The *Envision San José 2040 General Plan* sets forth a vision and a comprehensive road map to guide the City's continued growth through the year 2040. The following policies within the Plan relate to biological resources potentially affected by the Project.

ER-2.1. Ensure that new public and private development adjacent to riparian corridors in San José are consistent with the provisions of the City's Riparian Corridor Policy Study and any adopted Santa Clara Valley Habitat Conservation Plan / Natural Communities Conservation Plan (HCP/NCCP).

ER-2.4. When disturbances to riparian corridors cannot be avoided, implement appropriate measures to restore, and/or mitigate damage and allow for fish passage during construction.

ER-2.5. Restore riparian habitat through native plant restoration and removal of nonnative/invasive plants along riparian corridors and adjacent areas.

ER-4.1. Preserve and restore, to the greatest extent feasible, habitat areas that support special-status species. Avoid development in such habitats unless no feasible alternatives exist and mitigation is provided of equivalent value.

ER-4.3. Prohibit planting of invasive nonnative plant species in natural habitats that support special-status species.

ER-5.1. Avoid implementing activities that result in the loss of active native birds' nests, including both direct loss and indirect loss through abandonment, of native birds. Avoidance of activities that could result in impacts to nests during the breeding season or maintenance of buffers between such activities and active nests would avoid such impacts.

3.D.3 Impacts and Mitigation Measures

Significance Criteria

The CEQA Guidelines indicate that proposed project activities would have a significant effect on biological resources if they would:

(a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS.

(b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS.

(c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

(d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

(e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

(f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

Approach to Analysis

Avoidance and Minimization Measures Incorporated into the Project

Avoidance and minimization measures are those parameters that have been built into the design of the Project and are committed to as part of Project implementation. These measures are included in the Project Description (Section 2.E.1) of this report, but where appropriate, the specific measures related to the impact evaluations are also summarized below.

The following avoidance and minimization measures are contained in the District's Best Management Practices (BMP) Handbook (SCVWD, 2014), and have been incorporated into the Project, as feasible and appropriate. These measures would help to reduce the intensity of impacts to terrestrial biological resources associated with the Project, in accordance with District policy.

SCVWD's Best Management Practices (BMP) Handbook

BI-3. Remove Temporary Fills

BI-5. Avoid Impacts to Nesting Migratory Birds

BI-6. Avoid Impacts to Nesting Migratory Birds from Pending Construction

BI-7. Minimize Impacts to Vegetation from Survey Work

BI-8. Chose Local Ecotypes Of Native Plants and Appropriate Erosion-Control Mixes

HM-8. Ensure Proper Vehicle and Equipment Fueling and Maintenance

WQ-9. Use Seeding for Erosion Control, Weed Suppression, and Site Improvement

Similarly, the following Conditions and Avoidance and Minimization Measures from the SCVHP are incorporated into the Project. These measures, along with the Aquatic Avoidance and Minimization Measures listed in Table 6.2 of the SCVHP, are intended to protect endangered species and natural resources during activities permitted under the SCVHP; a comprehensive discussion of these measures is presented in Appendix C – Santa Clara Valley Habitat Plan.

Santa Clara Valley Habitat Plan Conditions

Condition 1. Avoid Direct Impacts on Legally Protected Plant and Wildlife Species

Condition 4. Avoidance and Minimization for In-Stream Projects

Condition 5. Avoidance and Minimization Measures for In-Stream Operations and Maintenance

Condition 11. Stream and Riparian Setbacks

Condition 12. Wetland and Pond Avoidance and Minimization

Condition 17. Tricolored Blackbird

Santa Clara Valley Habitat Plan Avoidance and Minimization Measures

5. Invasive plant species removed during maintenance will be handled and disposed of in such a manner as to prevent further spread of the invasive species.

13. Personnel shall use the appropriate equipment for the job that minimizes disturbance to the channel bed and banks. Appropriately-tired vehicles, either tracked or wheeled, shall be used depending on the situation.

15. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Listed species not covered by the Habitat Plan will not be relocated without the appropriate permits and authorizations from the correct agencies.

30. Vegetation control and removal in channels, on stream banks, and along levees and maintenance roads shall be limited to removal necessary for facility inspection purposes, or to meet regulatory requirements or guidelines.

31.1 When conducting vegetation management, retain as much understory brush and as many trees as feasible, emphasizing shade-producing and bank-stabilizing vegetation. Carry out the activity in such a manner as to minimize impacts to the natural community present and encourage regrowth of the community structure appropriate to the site.

31.2 If riparian vegetation is to be removed with chainsaws, consider using saws currently available that operate with vegetable-based bar oil.

49. The project or activity must be designed to avoid the removal of native riparian vegetation, where feasible. If the removal native of riparian vegetation is necessary, the amount shall be minimized to the amount necessary to accomplish the required activity and comply with public health and safety directives. Impacts to nonnative vegetation that is determined to be providing unique habitat value (such as shading, foraging habitat, or nesting area) shall be avoided and minimized in the same manner as native vegetation.

50. If levee reconstruction requires the removal of vegetation that provides habitat value to the adjacent stream (e.g., shading, bank stabilization, food sources, etc.), then the project will include replacement of the vegetation/habitat that was removed during reconstruction unless it is determined to be inappropriate to do so by the relevant resource agencies (e.g., CDFW and USFWS).

68. Stabilize stockpiled soil with geotextile or plastic covers. Materials that may entrap reptiles and amphibians, such as mono-filament erosion control materials, shall be avoided.

71. Preserve existing vegetation to the extent possible.

80. All personnel working within or adjacent to the stream setback (i.e., those people operating ground-disturbing equipment) will be trained by a qualified biologist in these avoidance and minimization measures and the permit obligations of project proponents working under this Plan.

84.1 Appropriate erosion control measures (e.g., fiber rolls, filter fences, vegetative buffer strips) will be used on site to reduce siltation and runoff of contaminants into wetlands, ponds, streams, or riparian vegetation. Erosion control measures will be placed between the outer edge of the buffer and the project site.

84.2 Fiber rolls used for erosion control will be certified as free of noxious weed seed.

84.3 Filter fences and mesh will be of material that will not entrap reptiles and amphibians.

86. Topsoil removed during soil excavation will be preserved and used as topsoil during revegetation when it is necessary to conserve the natural seed bank and aid in revegetation of the site.

89. The potential for traffic impacts on terrestrial animal species will be minimized by adopting traffic speed limits.

90. All trash will be removed from the site daily to avoid attracting potential predators to the site. Personnel will clean the work site before leaving each day by removing all litter and construction-related materials.

91. To prevent the spread of exotic species and reduce the loss of native species, aquatic species will be netted at the drain outlet when draining reservoirs or ponds to surface waters. Captured native fish, native amphibians, and western pond turtles will be relocated if ecologically appropriate. Exotic species will be dispatched.

92. To minimize the spread of pathogens all staff working in aquatic systems (i.e., streams, ponds, and wetlands)—including site monitors, construction crews, and surveyors—will adhere to the most current guidance for equipment

decontamination provided by the Wildlife Agencies at the time of activity implementation.

93. When accessing upland areas adjacent to riparian areas or streams, access routes on slopes of greater than 20% should generally be avoided. Subsequent to access, any sloped area should be examined for evidence of instability and either revegetated or filled as necessary to prevent future landslide or erosion.

95. To minimize entrapment of animals on job sites, the project biologist will survey the work area at the close daily activities to identify and remediate any potential areas or conditions that might trap animals. Examples of such include pits, trenches or pipes that animals can fall into or perforated pipes or netting that can cause entanglement.

103. Unless otherwise indicated in an Executive Directive issued by the Habitat Agency, for example a directive to address plant pathogens, (103.1) all disturbed soils will be revegetated with native plants, grasses, seed mixtures, or sterile nonnative species suitable for the altered soil conditions upon completion of construction. (103.2) Local watershed native plants will be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives. (103.3) All disturbed areas that have been compacted shall be de-compacted prior to planting or seeding. (103.4) Cut-and-fill slopes will be planted with local native or non-invasive plants suitable for the altered soil conditions.

105. Vegetation and debris must be managed in and near culverts and under and near bridges to ensure that entryways remain open and visible to wildlife and that passage through the culvert or bridge remains clear.

107. On streams managed for flood control purposes, when stream reaches require extensive vegetation thinning or removal (e.g., when the channel has been fully occluded by willows or other vegetation), removal will be phased so that some riparian land cover remains and provides some habitat value.

No Impact Significance Determinations

Of the resources considered under criteria (a), no special-status plant species have been documented in areas impacted by the Project and none are expected to occur in the Study Area. Therefore, the Project would not impact special-status plant species and no further discussion is warranted.

Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. The Project is in the area covered by the SCVHP and as a covered project is required to comply with all provisions of the plan including applicable conditions and avoidance and minimization measures from Table 6-2 of the SCVHP in Appendix C, as feasible and appropriate. For example, the Project would adhere to *Condition 1: Avoid Direct Impacts on Legally Protected Plant and Wildlife Species* and *Condition 17: Tricolored Blackbird* by conducting pre-construction surveys and ensuring compliance with regulations addressing species or impacts not covered by the SCVHP, as well as measures adopted during construction such

as the requirement that personnel be trained by a qualified biologist if they are conducting ground-disturbing activities in or adjacent to wetlands and ponds; and installation of erosion control measures. Exceptions to SCVHP measures would only be exercised if the avoidance and minimization measure would not be appropriate for the activity, or field data collected at the site or in comparable areas demonstrate the avoidance and minimization measure would not benefit wildlife or reduce impacts on natural communities. For example, due to the in-water nature of the Project, stream avoidance is not feasible; however, Project design requirements and measures would be implemented to avoid and minimize impacts to Alamitos Creek upstream and downstream of the Study Area.

Therefore, the Project would not conflict with the SCVHP.

Impact Summary

Table 3.D-1 provides a summary of biological resource impacts and by implementation phase (construction and operations).

TABLE 3.D-1
SUMMARY OF BIOLOGICAL RESOURCES IMPACTS

Impact Statement	Construction	Operation
Impact 3.D-1: Construction or operation of the Project would have a substantial effect on special-status birds, common nesting migratory birds and raptors, and roosting bats in the Study Area.	LSM	LS
Impact 3.D-2: Construction or operation of the Project would not have a substantial effect on California red-legged frog, foothill yellow-legged frog, and western pond turtle in the Study Area.	LS	LS
Impact 3.D-3: The proposed Project would not have a substantial adverse effect on riparian communities.	LS	LS
Impact 3.D-4: The Project would not have substantial adverse effects on jurisdictional wetlands, other Waters of the United States and Waters of the State.	LS	LS
Impact 3.D-5: The Project would not interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	LS	LS
Impact 3.D-6: The Project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	LSM	NI

NI = No impact
LS = Less than significant
LSM = Less than significant with mitigation

Impacts and Mitigation Measures

Impact 3.D-1: Construction or operation of the Project could have a substantial effect on special-status birds, common nesting migratory birds and raptors, and roosting bats in the Study Area. (Less than Significant with Mitigation)

Construction Impacts

Tricolored blackbird. Project activities, such as earthwork, excavation, dewatering of Almaden Lake and Alamitos Creek diversion, pipeline installation, could affect tricolored

blackbird breeding colony sites, if present, ~~indirectly~~ through increased fugitive dust, noise, vibrations, visual disturbance, or human activity from construction personnel. Other indirect impacts that could affect these species during construction would occur from the short-term loss of island vegetation, such as tule, cattail, and willow, during re-contouring of the existing island.

Although individuals may pass through the Study Area on a migratory basis, nesting colonies (not individuals) of tricolored blackbirds are unlikely to be present during the time of project construction. No tricolored blackbirds were observed during the 2015 reconnaissance-level field survey for the Project and there are no other records of colonies in the Study Area. The Project's distance to the nearest nesting colony is over five miles away indicating tricolored blackbirds have not historically used Almaden Lake as a colony nesting ground. In addition, existing predators in and around Almaden Lake such as black-crowned night heron, likely contribute to the improbable presence of a tricolored blackbird colony.

While presence of a nesting colony is unlikely, impacts on tricolored blackbird nesting colonies would be reduced through adherence to District BMP BI-5 Avoid Impacts to Nesting Migratory Birds and BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction. Construction would also be subject to SCVHP (Appendix BIO) Condition 17: Tricolored Blackbird. Implementation of Condition 17: Tricolored Blackbird, would ensure the Project would avoid or minimize impacts on tricolored blackbird nesting colonies, if present, by requiring pre-construction focused surveys for the species and establishing no work buffer zones around active nests, if identified. The application of the above District BMPs and SCVHP conditions and measures would ensure impacts to tricolored blackbird nesting colonies are less than significant.

Other Nesting Migratory Birds and Common and Special-Status Raptors. Great egret, snowy egret, great-blue heron, and black-crowned night heron are known to nest within the Study Area, specifically on the island in the lake. Known and potential suitable nesting habitat for double-crested cormorants is located within the north, south, and east areas of Almaden Lake Park and adjacent riparian areas. Common migratory birds and common and special-status raptors, including Cooper's hawk, ~~northern harrier,~~ red-tailed hawk, red-shouldered hawk, and green heron have the potential to nest in the Study Area's park trees and shrubs, riparian corridor, and on the lake island. Direct impacts to nests in mature trees, such as oak and eucalyptus, could occur from the removal of trees, vegetation on the island, riparian corridor, and general Almaden Lake parklands. Noise and visual disturbance generated from creek diversion and lake dewatering, site excavation and earthwork, construction of the levee, islands, and park could ~~indirectly~~ disturb nesting within the Study Area resulting in nest abandonment.

The District implements BMP BI-5, Avoid Impacts to Nesting Migratory Birds, and BI-6, Avoid Impacts to Nesting Migratory Birds from Pending Construction, to determine if active nests are located with the Project footprint. These measures, together with existing state and federal regulations reduce the intensity of impacts on nesting migratory birds and raptors. However, the loss or disturbance of an active nest would be a significant impact.

Implementation of Mitigation Measure 3.D-1a: Nesting Bird Protection Measures would ensure that the Project would have a less than significant impact on nesting birds by establishing no work buffer zones around active nests identified on or near the Project area.

Roosting Bats. The Project has the potential to ~~directly and indirectly~~ affect Yuma myotis, a WBWG[11] Low-Medium priority species, and hoary bat, a WBWG Medium priority species, during construction activities. Under the California Fish and Game Code, the following activities are prohibited and would be considered a significant impact: (1) destruction of an occupied, non-breeding bat roost, resulting in the death of bats; (2) disturbance that causes the loss of a maternity colony of bats (resulting in the death of young); or (3) destruction of hibernacula[12] (although hibernacula are generally not formed by bat species in the Bay Area due to sufficiently high temperatures year-round). Maternity roosts are those that are occupied by pregnant females or females with non-flying young. Non-breeding roosts are day roosts without pregnant females or non-flying young.

Direct disturbance could result from tree removal, or roost destruction by any other means. Indirect disturbance to bat roosts could result from construction-associated noise or vibration, or increased human activity in the area. Increased noise, vibration, lights or the reconfiguration of large objects can lead to the disturbance of roosting bats, which may lead to behavioral alterations. Human disturbance can also lead to a change in humidity, temperature, or the approach to a roost that could force the bats to change their mode of egress and/or ingress to a roost. Although temporary, such disturbance can lead to the abandonment of a maternity roost, which in most cases would be a significant impact (H.T. Harvey & Associates, 2004).

Although there is an existing high level of disturbance in the Project vicinity originating from the roadways and recreational and maintenance activities in Almaden Lake Park, suitable roosting habitat could be present in the dense foliage along the riparian corridors of Alamitos Creek and Guadalupe Creek. Construction activities, such as tree removal, could ~~directly or indirectly~~ destroy bat roosts or disturb maternity colonies, a significant impact.

Impacts to roosting bats as a result of construction would be reduced to less than significant through adherence to Mitigation Measure 3.D-1b (Protective Measures for Bats). These measures would require a preconstruction survey of structures possessing suitable bat roosting habitat in the Project area, and the establishment of an adequate construction buffer to prevent inadvertent disturbance of active roosts.

Operational Impacts

Special-status and Common Migratory Birds and Raptors, and Roosting Bats. Creation of foraging and nesting habitat along the restored Alamitos Creek floodplain, levee, and new and expanded lake islands would improve conditions for special status and common migratory

[11] Western Bat Working Group (WBWG) is composed of agencies, organizations, and individuals interested in bat research, management, and conservation from the 13 western states and provinces. Species are ranked as High, Medium, or Low Priority in each of 10 regions in western North America.

[12] Hibernaculum (plural hibernacula) refers to the winter quarters of a hibernating animal.

birds and raptors and roosting bats. Maintenance activities during the establishment phase of wetland and riparian vegetation would adhere to District BMP BI-5 (Avoid Impacts to Nesting Migratory Birds) and SCVHP Avoidance and Minimization Measures and be similar to current and ongoing vegetation management, including weeding, and debris removal. As such, impacts on special-status and nesting common migratory birds and raptors resulting from the incremental increase in maintenance activity is less than significant.

Mitigation Measures

Mitigation Measure 3.D-1a: *Nesting Bird Protection Measures*. The District and/or its contractor(s) shall implement the following during construction of the Project:

- Removal of trees and scrub vegetation shall occur outside the bird nesting season (January 15 ~~February 1~~ to September 1 ~~August 31~~), to the extent feasible.
- If removal of trees and vegetation cannot be fully accomplished outside of nesting season, a qualified biologist shall conduct preconstruction nesting surveys within seven days prior to the start of such activities or after any construction breaks of seven ~~10~~ days or more. Surveys shall be performed for the Study Area and suitable habitat within 250 feet of the project site to locate any active raptor (birds of prey) nests or rookeries.
- If active nests are located during the preconstruction bird nesting survey, the qualified biologist shall evaluate if the schedule of construction activities could affect the active nests and the following measures shall be implemented based on their determination:
  - If construction is not likely to affect the active nest, it may proceed without restriction; however, a biologist shall regularly monitor the nest to confirm there is no adverse effect and may revise their determination at any time during the nesting season. In this case, the following measure would apply.
  - If construction may affect the active nest, the biologist shall establish a no disturbance buffer in consultation with CDFW. Typically, these buffer distances are 50 feet for passerines and between 300 feet for raptors. These distances may be adjusted depending on the level of surrounding ambient activity (e.g., if the project area is adjacent to a road or active trail) and if an obstruction, such as a building, is within line-of-sight between the nest and construction. For bird species that are federally and/or state-listed sensitive species (i.e., fully protected, endangered, threatened, Species of Special Concern), a District ~~or City~~ representative, supported by the qualified biologist, shall coordinate with the USFWS and/or CDFW regarding modifications to nest buffers, prohibiting construction within the buffer, modifying construction, or removing or relocating active nests that are found on the site.
  - Any birds that begin nesting within the project area and survey buffers amid construction activities are assumed to be habituated to construction-related or similar noise and disturbance levels. Qualified biologist, shall coordinate with the USFWS and/or CDFW and determine if no work exclusion zones shall be established around active nests in these cases.

Mitigation Measure 3.D-1b: *Protective Measures for Bats*. The District shall engage a qualified biologist to conduct a habitat assessment for suitable bat roost habitat

features, followed by a preconstruction survey(s) of the Project area as needed in order to locate active colonies and/or special-status species, conducted in an appropriate timeframe in advance of initiation of tree trimming or removal, or disturbance to other potential roost features, and to plan work accordingly to avoid or minimize impacts. The preconstruction survey should include at a minimum: a) identification of potential direct and indirect Project-related disturbing activities; b) locations of potential roost habitat features; c) species identification and locations of active bat colonies or special status bats within or adjacent to the Project area, along with estimated numbers when possible; and d) a description of protective measures to be implemented prior to construction. No Project-related activities that could disturb active roosts shall proceed prior to the completed surveys.

Should special-status bats be found in trees or structures to be disturbed under the Project, or it is determined by a qualified biologist that Project activities would result in significant impacts to bats, the following measures shall be implemented:

- Removal of trees shall occur when bats are active, approximately between the periods of March 1 to April 15 and August 15 to October 15; outside of bat maternity roosting season (approximately April 15 – August 31); and outside of months of winter torpor (approximately October 15 – February 28), to the extent feasible.

- If removal of trees or disturbance to other roost features during the periods when bats are active is not feasible and active bat roosts being used for maternity or hibernation purposes are found within or in the immediate vicinity of the Project area where tree removal or other disturbance is planned, an appropriate no-disturbance buffer, determined by a qualified biologist, shall be established around the roost sites until they are determined to be no longer active by a qualified biologist. If special-status bats are identified, CDFW shall be contacted for further guidance.

- The qualified biologist shall be present onsite to monitor during tree or habitat feature disturbance if active bat roosts are present.

- Removal of trees containing or suspected to contain active bat roosts shall be removed under the supervision of the qualified biologist on the second day of a two-day removal process. Trees shall be removed through a two-phase process to significantly change the roost conditions by trimming branches during the first phase, causing bats, if present, to abandon the roost at night, before completely removing the tree on the second day. Trees with active roosts shall be removed only when no rain is occurring or is forecast to occur for three days, and when daytime temperatures are at least 50˚F.

- If there are significant impacts to bat roosting habitat (e.g., maternity roosts or hibernacula of sensitive or special -status species, or large non-maternity roost sites of sensitive species, or any number of special status species) due to project activities, a qualified biologist experienced in successful bat mitigation techniques shall develop a Bat Avoidance Plan including adequate buffer zones and/or other requirements to minimize the impact to the roosting site.

Significance after Mitigation: Less than Significant. The District will implement BMP BI-5, SCVHP Avoidance and Minimization Measures, and Mitigation Measure 3.D-1a, which taken together require the District and contractors to survey for nesting birds and establish

adequate construction buffer areas to minimize impacts to nesting birds during construction. Mitigation Measure 3.D-1b ensures that surveys are conducted for bats and construction buffers are established as warranted. These measures ensure that impacts to special status species are reduced to a less than significant level.

Impact 3.D-2: Construction or operation of the Project would not have a substantial effect on California red-legged frog, foothill yellow-legged frog, and western pond turtle in the Study Area. (Less than Significant)

Construction Impacts

California Red-Legged Frog and Foothill Yellow-Legged Frog. The majority of the Study Area does not include suitable breeding features for California red-legged frog and foothill yellow-legged frog; however, the Alamitos Creek ~~and Guadalupe River~~ riparian corridor~~s~~ could support migration and foraging opportunities. Marginal habitat in shallow waters and emergent aquatic vegetation for these special-status frog species is present in the creek and riparian communities in the northern and southern portions of the Study Area.

As mentioned above, the nearest occurrence of the California red-legged frog and foothill yellow legged frog is less than three miles south of the Study Area in the vicinity of Guadalupe Reservoir. Based on known occurrences (CDFW, 2020 ~~2019b~~) and habitat suitability, California red-legged frog and foothill yellow-legged frog are largely absent from the portions of the Santa Clara Valley floor that have been heavily impacted by urban development, such as the surroundings of the Study Area. Furthermore, the general lack of high quality instream riparian habitat in the majority of the Study Area coupled with the isolation from known populations due to human disturbance reduces the potential for California red-legged frog and foothill yellow-legged frog to occur within the Study Area.

Construction would be subject to SCVHP Avoidance and Minimization Measures which are designed to minimize impacts to California red-legged frog and foothill yellow-legged frogs. These measures include preconstruction surveys, biological training, decontamination practices, monitoring of construction activities that may impact suitable frog habitat, and upholding regulatory agency permit obligations.

Given the low potential for special status amphibians to be present on or near the site, and the implementation of SCVHP Avoidance and Minimization Measures, impacts to these species are less than significant.

Western Pond Turtle. Western pond turtles are likely to occur in a variety of aquatic habitats provided by Alamitos Creek, Guadalupe Creek, and Almaden Lake. Although western pond turtles are known to nest and migrate through the Study Area, the high degree of human disturbance from ongoing and past uses has resulted in the upland dispersal habitat being of marginal quality. However, if present, this species could be ~~directly or indirectly~~ affected during Project construction. Substantial direct impacts to western pond turtles foraging,

experiencing thermoregulation, nesting, and avoiding predators within creek and river banks and lake island vegetation could result from proposed water diversion or dewatering, vegetation and debris removal, pipeline installation, and excavation. Similarly, levee construction, re-contouring, and open park area construction could directly impact turtles basking or migrating through non-canopied parklands or ~~indirectly~~ through increased noise and vibratory activities within the Study Area.

Construction would be subject to SCVHP Avoidance and Minimization Measures which are designed to minimize impacts to aquatic reptiles. These measures include preconstruction surveys, biological training, decontamination practices, monitoring of construction activities that may impact suitable habitat, and upholding regulatory agency permit obligations. Impacts to western pond turtle are less than significant with the implementation of SCVHP Avoidance and Minimization Measures.

Operational Impacts

California Red-legged Frog, Foothill Yellow-legged Frog, and Western Pond Turtle. Improvements to hydrologic function and aquatic habitat as a result of riparian vegetation planting along banks of the restored Alamitos Creek and Almaden Lake, and habitat created on the new and expanded islands, would overall be beneficial and reduce the intensity of adverse impacts to California red-legged frog, foothill yellow legged frog, and western pond turtle.

Future maintenance of the site could include vegetation ~~and sediment~~ removal in the restored Alamitos Creek if necessary. Such maintenance activities would be subject to District BMPs and be done consistent with the District's Stream Maintenance Program and SCVHP Avoidance and Minimization Measures which include measures to minimize impacts to amphibians and reptiles such as preconstruction surveys, decontamination practices, and monitoring of construction activities. Operational impacts to California red-legged frog, foothill yellow-legged frog, and western pond turtle would be less than significant.

Mitigation Measures

None required.

Impact 3.D-3: The proposed Project would not have a substantial adverse effect on riparian communities. (Less than Significant)

Construction Impacts

There are 0.41 ~~2.39~~ acre~~s~~ of riparian habitat in the Study Area. However, there is also substantial riparian habitat along Alamitos Creek upstream of the Study Area and along Guadalupe Creek and Guadalupe River downstream of the Study Area.

Project construction would require the removal of trees and surface vegetation in riparian areas located at the edge of the lake, where Alamitos Creek enters and exits the lake. Of the approximately 81 to 95 trees that could ~~to~~ be removed during Project construction, a small portion of them, ~~covering approximately 0.26 acre,~~ ~~is~~ are within riparian habitat. ~~Trees that would be removed along the Almaden Valley Pipeline upstream from the Park are outside the riparian corridor of Alamitos Creek.~~ The outlet pipeline under Guadalupe Creek would be installed using horizontal directional drilling, a trenchless technique allowing the bore pits to be located outside the Guadalupe Creek riparian corridor.

Indirect impacts may occur from dewatering the lake and diverting Alamitos Creek water around construction areas, vegetation trimming, and soil disturbance can alter soil moisture and the depth to the water table. Lowering groundwater levels by just one meter beneath riparian areas is sometimes sufficient to induce water stress in riparian trees (NAP, 2002). Construction and vegetation trimming could introduce nonnative invasive plants to the Alamitos Creek riparian corridor and expose riparian trees to pest or pathogens; mechanical damage to tree trunks and canopies by inadvertent contact by construction equipment, vehicles, or construction materials; or root damage from grading, excavation activities, or soil compaction from heavy equipment or vehicle traffic. ~~These kinds of indirect or accidental impacts could affect approximately 1.34 acres of riparian habitat.~~

The District would implement BMPs: HM-8: Ensure Proper Vehicle and Equipment Fueling and Maintenance which would minimize the potential for hazardous materials to adversely impact riparian vegetation, and WQ-9: Use Seeding for Erosion Control, Weed Suppression, and Site Improvement, which would require disturbed areas to be seeded with native seed as soon as is appropriate after activities are complete thereby lessening the opportunity for nonnative plants to colonize.

The SCVHP requires implementation of Aquatic Avoidance and Minimization Measures; specifically, SCVHP Table 6-2 (Appendix C) relating to Condition 4: Avoidance and Minimization for In-Stream Projects, Condition 12: Wetland and Pond Avoidance and Minimization, and Avoidance and Minimization Measures 49. These measures identify proper construction practices that minimize impacts on riparian community flora and fauna. Measures in Table 6-2 relating to these conditions include:

- Construction workers are to receive training by a qualified biologist of avoidance and minimization measures to ensure that construction equipment and personnel avoid riparian areas outside of the work area;
- Use of appropriate erosion control measures such as filter fences and fiber rolls to reduce siltation and runoff of contaminants into riparian vegetation; retaining topsoil removed during construction for post-construction use; and
- Restricting use of invasive nonnative species seeds in erosion control applications; and requiring installation of natural methods for erosion control measures.

Due to the relatively small area of riparian habitat that is in the Study Area and that may be impacted by Project construction, and the fact that riparian habitat upstream and

downstream of the Project would remain intact during construction, construction impacts would not have a substantive effect on riparian habitat quality or function. In addition, the Project would create more continuous and higher-quality riparian habitat than would be impacted. As such, Project construction would have a less than significant impact on riparian habitat.

Operational Impacts

Per the Project's conceptual revegetation plan, 0.97 acres of riparian habitat would be created, a portion of the overall ~~11~~ 10-acre creek and floodplain restoration. Operation and maintenance of the Project would include treatment of nonnative invasive plants that may have been introduced or spread by construction.

Under the Project, the District and City would continue to routinely perform vegetation management activities, including removal of invasive vegetation and levee mowing, monitoring of the low flow channel for hazardous tree conditions, channel blockages, and other conditions that could impede flow or create local drainage problems, and treatment of those conditions and problems. Such activities may result in localized impacts to restored Alamitos Creek riparian vegetation.

Localized and inadvertent adverse impacts to the Alamitos Creek riparian corridor, such as trampling, contamination or erosion resulting from tools or equipment used in maintenance activities, or spread of nonnative vegetation, would be minimized through adherence to the following District BMPs: BI-7 Minimize Impacts to Vegetation from Survey Work, BI-8 Choose Local Ecotypes of Native Plants and Appropriate Erosion-Control Seed Mixes, HM-8: Ensure Proper Vehicle and Equipment Fueling and Maintenance, and WQ-9: Use Seeding for Erosion Control, Weed Suppression, and Site Improvement.

The increase in riparian vegetation created by the Project would enhance ecosystem function associated with the riparian community in the Study Area. As discussed in Section 2.D.1, benefits to the riparian community include expansion of habitat for many species of birds, reptiles, and amphibians; in addition to extending movement and refuge habitat for mammals utilizing the upstream Alamitos Creek corridor and watershed. None of these benefits are currently provided by the lake. Increased District operations accessing the additional riparian areas, such as vegetation management along the restored creek and islands, would be considered a less than significant impact since inspection and maintenance would be consistent with standard District vegetation practices and BMPs and in light of the amount of riparian habitat created by the Project.

Mitigation Measures

None required.

Impact 3.D-4: The Project would not have substantial adverse effects on jurisdictional wetlands, other Waters of the United States and Waters of the State. (Less than Significant)

As discussed above, Almaden Lake, Alamitos Creek, and Guadalupe Creek are Waters of the U.S. and Waters of the State. Elements of the Project would impact these features during the construction and operation phases. The below discussion analyzes wetlands and waters collectively. Riparian habitat was specifically analyzed under impact 3.D-3 and is not included in the acres or analysis of wetland habitat below.

Construction Impacts

Table 3.D-2 provides a summary of anticipated impacts to jurisdictional wetlands and waters during the construction phase of the Project.

TABLE 3.D-2
IMPACTS TO JURISDICTIONAL WETLANDS AND WATERS ~~AND RIPARIAN COMMUNITIES~~

Water/Wetland Feature	Existing (Acres)	Temporary Impacts (Acres)	Permanent Impact (Acres)	Post-Project (Acres)	Net Gain/(Loss) Habitat (Acres)
Almaden Lake (open water)	30.97 ~~32.45~~	15.00 ~~17.01~~ (dewatering & ground disturbance)	15.97 ~~15.44~~	15.00 ~~17.01~~	(15.97) ~~44 acres)~~
Alamitos Creek and Floodplain	0.22 ~~0.45~~	0.22 ~~0.45~~ (creek diversion & cofferdam)	0	9.98 ~~11.75~~	9.76 ~~11.30 acres~~
Guadalupe Creek	0.04 ~~0.14~~	0	0	0.04 ~~0.14~~	0
Lake, Islands Wetlands	0.46	0.46	0	1.66 ~~96~~	1.20 ~~50 acres~~
~~TOTAL~~	~~33.50~~	~~17.92~~	~~15.44~~	~~30.86~~	~~(2.64) acres~~

Temporary Impacts

Wetlands and waters would be temporarily affected by installation of the cofferdam at the Alamitos Creek footbridge, diversion of Alamitos Creek, and the dewatering, recontouring, and capping of the bed of Almaden Lake. The installation of a temporary cofferdam at the Alamitos Creek footbridge and diversion of creek water behind the cofferdam to a downstream location near the Coleman Road bridge would temporarily impact 0.22 ~~0.45~~ acre~~s~~ of jurisdictional waters and wetlands in the Alamitos Creek channel and fringing wetland vegetation. Cofferdam installation would result in vegetation clearing, disturbance of the channel substrate, and water fluctuations which could temporarily impact the channel and fringing wetland vegetation. The cofferdam and diversion of Alamitos Creek would occur during the dry season of the first construction season. Once sheet piles are installed along the alignment of the proposed levee system, Alamitos Creek flows would be released back into the creek. Diverting the creek may occur again during the second year of construction to facilitate the west bank reconfiguration and floodplain construction if this does not occur in the first year of construction.

The 15.00 ~~17.01~~-acre portion of Almaden Lake that would be conserved by the Project would be dewatered to facilitate construction, and the bed of the lake would be recontoured and capped with clean fill material to isolate mercury in the lake-bed sediment and improve water quality conditions. This would intentionally remove the current benthic community of the lake, which is contaminated with methylmercury. Following construction and re-watering of the lake, a benthic community would re-establish with a water supply that has a lower elemental mercury content and under lake contour conditions which would promote better circulation that has lower potential for mercury methylation.

Dewatering of Almaden Lake would also temporarily impact 0.46 acres of freshwater marsh vegetation along the eastern lake shoreline. Although this vegetation would be protected during construction, the lack of water supply during lake dewatering would impact wetland plant survival for approximately six months to two years depending on construction phasing. Once construction is complete, the open waters would be restored and wetlands can re-establish.

Temporary impacts to wetlands and waters as a result of creek diversion, cofferdam installation, and lake dewatering would affect a relatively small area of wetland habitat. The temporary impact to the conserved Almaden Lake bed from dewatering, recontouring, and capping is essential to achieving the water quality goals of the Project and reducing the supply of methylmercury to the Guadalupe River Watershed. In addition, these resources can restore their natural value and function under typical conditions after Project construction. Also, with the implementation of District BMP BI-3 Remove Temporary Fills, temporary impacts to wetlands and waters would not exceed the duration necessary to complete the work, as this measure requires removal of temporary fill material upon completion of work, or as appropriate. The District would also require the Project to implement the District BMP and implement control measures that would prevent slurry water from entering waterways, discussed in detail in Section 2.E.1 and Section 3.I Hydrology and Water Quality, reducing temporary impacts to jurisdictional water quality as a result of potential soil erosion or accidental release of deleterious materials during construction. Aquatic Avoidance and Minimization Measures in Table 6.2 of the SCVHP would also be implemented to further reduce the duration and extent of impacts to jurisdictional wetlands and waters. As such, temporary impacts to Alamitos Creek and Almaden Lake jurisdictional wetlands and waters would be less than significant.

Permanent Impacts

The Project would result in a total loss of 15.97 acres of degraded open water, as noted on Table 3.D-2. The majority of this area would be converted from open water to creek and floodplain habitat. A small area would be converted to an expanded island, new island, and associated wetland habitat. ~~The restoration of the creek channel and floodplain would permanently convert 11.30 acres of open water to creek and floodplain habitat. The existing island in the lake is approximately 0.5 acres in area and is not counted as open water or as wetland in the wetland delineation prepared for the Project. The Project would expand this island to 0.75 acres in area and create a second island also 0.75 acres in area. The expansion of the island and creation of a new island would convert 1.00 acres of open water~~

~~to wetland habitat and convert 0.5 acres of upland (the existing island) to wetland habitat. The construction of the levee separating the creek from the new lake would result in the permanent fill of 0.79 acres to the existing lake's open water and up to 2.35 acres of existing lake would be converted to new upland Park area. The relocation of the existing boat house and boat launch ramp would not result in loss of waters as the new location of the boat launch ramp would cover lake waters to the similar extent as under existing conditions, or in an area of fill already covered elsewhere in this analysis. In total, the proposed Project would conserve 17.01 acres of Almaden Lake open water, convert approximately 11.30 acres of open water to creek, floodplain, and wetland habitat, convert 3.14 acres of open water to upland habitat, and convert 0.50 acres of upland habitat (existing island) to wetland habitat.~~

Permanent and temporary impacts to wetlands and waters would be offset by a net gain in wetland and water function and values after Project implementation, as the Project is intended to benefit wetlands and open water habitats in the near and long term. In addition, the benefits of creek restoration and enhancements to the lake would extend beyond the Project footprint. This is because opening fish passage by restoring Alamitos Creek would benefit steelhead and Chinook salmon, which both require unimpaired and unconstrained passage from freshwater to the ocean to complete their life history and to sustain local populations. The Project would also improve water quality in discharges into the Guadalupe River system because methylmercury production in the Lake would be minimized. The Project's benefits to the open water of Almaden Lake include a reduction in the presence of mercury methylation and reduced anoxic conditions, which would improve water quality in the lake. The new source of water in the lake would have a lower elemental mercury content. The Project removes the direct linkage of Alamitos Creek water flowing into the lake and eliminating the deposition of elemental mercury into the lake from upstream sources thereby improving the quality of the waters in the Study Area and the Guadalupe River system downstream. The native wetland vegetation and improved water quality provided by the Project in the lower floodplain, on the levee, and on the expanded and new islands, would result in a greater quantity and overall benefit to the wetland community compared to existing wetlands, which are isolated and small in size.

The wetlands proposed by the Project upon refilling the lake would be consistent with existing Alamitos Creek upstream channel vegetation and would enhance wetland habitat structure and diversity. The improved ecosystem resulting from the conversion of Almaden Lake open water to creek and floodplain would slow and sequester runoff and associated pollutants and fine sediment before they enter the restored creek and lake waters. The removal of water nutrients and addition of dissolved oxygen would further enhance ecosystem function and reduce the potential of algal blooms affecting water quality and wildlife habitat. Wetlands and waters in the Study Area would benefit from naturally functioning ecosystem offered by the Project. The planting of the new creek, floodplain, and lake margins would provide ecosystem services that are not provided under existing conditions, such as stream temperature maintenance, nutrient uptake, and continuous habitat for a diversity of species. The new levee and Park area that would convert <u>a small amount of</u> ~~acres~~ of degraded Almaden Lake open water to upland habitat are necessary to provide the enhanced lake, creek and floodplain habitat and functions provided by the

Project. Although these areas would no longer be jurisdictional waters, they would also be planted to enhance habitat conditions for native wildlife. As such, permanent impacts to wetlands and waters as a result of the Project construction would be less than significant. Enhancement to water quality and beneficial uses in jurisdictional waters achieved by the Project would more than compensate for the Project's temporary construction impacts, as well as impacts of the District's Upper Berryessa Project.[13]

Operational Impacts

Routine vegetation management and structural maintenance activities, as discussed in Chapter 2, Project Description, are expected to increase, compared to current conditions, after the new levee is constructed, planting of native vegetation is completed, and solar-powered circulators are added to the lake. After initial revegetation, monitoring of the plantings would occur to determine the need for additional maintenance or remedial actions, such as replacement plantings, substitute species, watering, weeding, and/or nonnative plant treatment. After revegetation establishment, vegetation in the floodplain, on the levee, and on the new and expanded islands may require maintenance and would be similar in frequency to existing maintenance. Routine activities such as sediment removal, grading, and infrastructure repairs, as a result of the Project elements, would require accessing open waters and the floodplain within the Project area. ~~Sediment removal is anticipated to be necessary only every 10 years.~~ Sediment removal would result in temporary impacts to the restored Alamitos Creek channel, but there would be no permanent loss of wetlands.

Vegetation management and maintenance activities in the Project area would be carried out according to the District's Stream Maintenance Program (SMP) and/or Vegetation Management Unit and the City's Parks and Recreation Division. Maintenance impacts would be reduced with the implementation of BMPs, such as the District's SMP Program Manual. Furthermore, the District would implement BMPs to minimize the potential for degradation of water quality in wetlands and open waters. As discussed in Impact 3.J-2, use of pesticides would be required to comply with pesticide regulations designed to ensure that the pesticides would be applied in a safe manner to protect the safety of the workers and the public, and in a manner appropriate for the environment. These activities would not result in substantial adverse effects because maintenance activities would be beneficial to the resource, infrequent, and would only require brief periods of activity at each location when maintenance is required. Additionally, the overall net gain in the quality of restored creek and lake would offset any adverse impacts resulting from the Project's increased vegetation and water quality management activities. Overall, operational and maintenance activities at Almaden Lake and Alamitos Creek would be less than significant under the Project as they would result in an enhancement of ecosystem function and continue in a similar nature as they are currently implemented.

[13] Memo from SFRWQCB to SCVWD, August 8, 2018, Proposed Use of Almaden Lake Project to Comply with the Order for the Upper Berryessa Creek Flood Risk Management Project.

Mitigation Measures

None required.

Impact 3.D-5: The Project would not interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (Less than Significant)

Construction and Operational Impacts

The Study Area is in an urbanized area of San José and is consistently exposed to human disturbance originating from adjacent streets and recreationalists using Almaden Lake Park. Outside of the natural corridors along Alamitos Creek, the Study Area is largely surrounded by built uses, which block migration of terrestrial species. Any wildlife movement in the area is likely habituated to high levels of human activity.

The construction phase of the Project could temporarily alter terrestrial wildlife movement or native wildlife nursery site in Alamitos Creek corridor or Almaden Lake; however, the area of impact and proposed construction duration would not substantially impact or impede these activities. Suitable movement corridors and habitat for these species are found immediately upstream and downstream of the Study Area. The proposed riparian vegetation enhancements along the Alamitos Creek corridor would provide increased habitat and cover, in comparison to existing conditions where landscaped lake margins are more exposed and provide limited natural areas for dispersal, foraging and breeding. The proposed wetland, riparian, and upland vegetation along the rehabilitated creek could thereby support increased wildlife movement, helping to connect upstream areas with downstream reaches of the Guadalupe River Watershed. The construction and enhancements of the lake islands would create additional habitat for migratory birds and aquatic based wildlife, such as western pond turtles. These islands are viewed as an enhancement as they provide habitat areas that are isolated from human disturbance and land-based predators. Impacts to nesting birds and special-status wildlife species using the riparian corridor within the Study Area during construction, are further discussed under Impact 3.D-1 and Impact 3.D-2, above. Fisheries and fish passage are discussed in Section 3.E Fisheries Resources.

For these reasons the Project would enhance the quality of the Project area with respect to wildlife movement. Therefore, the Project would not substantially adversely interfere with the movement of any native resident or migratory wildlife species or with an established native resident or migratory wildlife corridor, or impede the use of a native wildlife nursery site, and the impact would be less than significant.

Mitigation Measures

None required.

Impact 3.D-6: The Project could conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less than Significant with Mitigation)

Construction Impacts

The City of San José provides for the protection of trees in the Municipal Code (Code) Sections 13.28, 13.32 and 13.44.220. A tree subject to the Code is a single trunk tree, 38 – inches or more in circumference at 4.5 feet above ground; or a multi-trunk tree, the combined measurements of each trunk circumference add up to 38-inches or more. As discussed in the Code, the City Council maintains a Heritage Tree List for the official recognition and protection of trees on both private and public property that are of special significance to the community because of their history, girth, height, species or unique quality. There are no heritage trees in the vicinity of Almaden Lake or the project pipeline alignments~~; however, there are two heritage trees located near the north end of Crossview Drive on private property~~.[14] The Code also applies to 'Street Trees,' defined as any tree that is planted on a street (Municipal Code Section 13.28.095), and trees within parks, unless authorized in writing by the director of the department of recreation, parks. The City also has a Community Forest Master Plan (Community Forest Committee, 2009) and Community Tree Policy Manual & Best Management Practices (City of San José, 2013).

Project construction would require the removal of approximately 81 to 95 trees in the study area. ~~The Project would remove approximately 81 trees to accommodate Project construction. These do not include the heritage trees near Crossview Drive. However, trees to be removed along Crossview Court may be considered 'Street Trees.' Trees would be removed within Almaden Lake Park, and along the Alamitos Creek Trail for the Almaden Valley Pipeline.~~ The District would obtain written authorization or permit for removal or potential damage of all trees if required pursuant to the City of San José Municipal Code ~~that meet the City of San José Code requirements for street trees and parks~~. In addition, the Project would implement the tree protection and replacement requirements of the City if required by the City. Therefore, tree removal would be a less than significant impact.

The Project~~, and in particular the Almaden Valley Pipeline connection work,~~ could also ~~indirectly~~ impact up to 54 trees subject to the City Code through inadvertent limb and/or root damage. Such damage could lead to tree mortality after Project construction is completed, which would conflict with the City Code, plans, and guidance related to trees and would be considered a significant impact.

Implementation of Mitigation Measure 3.D-6 (Tree Protection Measures) would ensure the Project protects trees that promote the health, safety, and welfare of the city from inadvertent damage, and reduce the Project's potential for conflict with City of San José tree codes, plans, and guidance to less than significant with mitigation.

[14] http://www.sanjoseca.gov/index.aspx?NID=3435

Operational Impacts

The Project specifies the banks of the restored channel would be planted with a corridor of native riparian trees consistent with existing Alamitos Creek upstream channel vegetation. Portions of the upper floodplain would be planted with western sycamore, coast live oak, and California buckeye.

The Project would require ongoing maintenance, including vegetation trimming and other vegetation related maintenance. However, weedy species would generally be removed when small, and removal of larger trees subject to the City's tree ordinance is not anticipated under routine Project maintenance. Therefore, the Project would not affect trees protected under City requirements, and no impact would occur as part of Project operation.

Mitigation Measures

Mitigation Measure 3.D-6: *Tree Protection Measures*. Trees adjacent to the project area that are retained during construction can still experience irreparable damage to roots and other tree parts with excavation, compaction, mechanical injury, and/or over pruning for construction access.

- Construction impacts shall be evaluated and planned to avoid locally native trees and other trees protected by City code. A site meeting with contractor, certified arborist, and other project personnel shall be conducted prior to construction to discuss tree protection measures and specific tree resources. The construction contract must include the on-call services of qualified arborist.

- All pruning work shall be conducted or directly overseen by a certified arborist. All pruning shall be done in accordance with ISA "Tree Pruning Guidelines" and/or the ANSI A300 Pruning Standards. Pruning of limbs and roots shall be minimized and conducted during cool, dry weather outside the active growing season when feasible. Access needs and equipment clearance shall be determined well in advance of construction to help schedule required pruning work at a time that is least detrimental to the tree species involved.

- Pruning of more than 25% of an individual tree's canopy or crown in a single season shall be avoided. Removal of live limbs greater than 4 inches in diameter shall be avoided if possible or receive prior approval by a certified arborist. Selective removal of tree limbs for equipment access is always preferable to mechanical injury or incidental contact of equipment with tree parts during construction. Some branches may be tied back temporarily, rather than removed, to facilitate site access.

- Establish a "Tree Protection Zone" (TPZ) around trees retained in the project area during construction. The TPZ shall be clearly marked and defined in the field using fencing or similar access deterrent and should be determined by the City's Arborist, or the Project designated ISA Certified arborist. No grading, compaction, excavation, soil storage, equipment storage, hazardous material storage, removal of understory vegetation, or equipment operation shall be conducted in the TPZ.

- Any grading, construction, demolition, or excavation work that may encounter live tree roots (from trees scheduled for retention in Project area) shall be monitored by a certified arborist. Roots may extend beyond the canopy dripline or there may be insufficient space available for an adequate TPZ. Compaction of undisturbed native soils shall be considered as part of root area impacted by construction.

- When larger roots (>2-inch diameter) are encountered during construction, excavations shall only continue by hand or with smaller, hand-held tools (e.g. air spade) until sufficient root area has been exposed to cut it cleanly with a sharp instrument (e.g. pruning saw, cut-off saw, loppers) to remove the portion overlapping the construction area. Root pruning shall by conducted by or under direct supervision of a certified arborist.
- If feasible, root pruning along the outside edge of a trench or other excavation shall be conducted prior to construction utilizing a combination of small equipment (i.e. trencher, small backhoe, cut-off saw) and hand tools. This "pre-pruning" gives the trees a chance to adapt to root loss prior to construction and develop new feeder roots that aid in water absorption.
- All tools used for pruning of tree roots or limbs shall be kept sharp and regularly disinfected to discourage the spread of plant pathogens.

Significance after Mitigation: Less than Significant. The implementation of Mitigation Measure 3.D-6 would ensure that the Project complies with all San José policies and regulations regarding the protection of trees by protecting the canopy, limbs, and roots of regulated trees that may be impacted by construction activities.

3.D.4 References

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3.E Fisheries Resources

This section addresses effects to fisheries resources that may result from implementation of the Project. Analysis of fisheries resources addresses native fish species and their aquatic habitat within the Project footprint as well as adjacent habitat outside of these boundaries. The term "Study Area" is used to describe all of Almaden Lake, small portions of Alamitos Creek, Guadalupe Creek, and Guadalupe River. In instances of specific reference to the construction footprint; the term "Project site" is used. The fisheries resources described in this section include aquatic habitats, primarily lacustrine and fluvial, along with the special-status fish species that occur therein. Special-status fish species included in this section are those designated by federal or state agencies as endangered, threatened, or proposed for listing, candidate species; and state or local species of concern. The existing hydrology and water quality condition within the Study Area are discussed only as they relate to fisheries resources, for a more detailed discussion of impacts to hydrology and water quality please refer to Section 3.K, Hydrology and Water Quality. For a detailed discussion of non-fisheries related biological resources, please refer to Section 3.D, Biological Resources.

This section also identifies the federal, state, and local regulations related to fisheries resources with jurisdiction over the Study Area. Information used in the preparation of this chapter was primarily obtained from the National Marine Fisheries Service's (NMFS) and California Department of Fish and Wildlife's (CDFW) list of federally threatened and endangered species known to occur in the Study Area, a reconnaissance-level field survey conducted by ESA biologist, Garrett Leidy on February 12, 2016, historical fish survey records, District technical memorandums, and best-available scientific literature.

3.E.1 Environmental Setting

Regional Setting

The Study Area is located within the Guadalupe River Watershed, draining approximately 170 square-miles of the Santa Cruz Mountains and surrounding valley floor, into South San Francisco Bay. As with many watersheds on the west side of the Santa Cruz Mountains, the upper zone is largely undeveloped, a significant portion of which is off limits to the public and legally protected (SCBWMI, 2000). In contrast, the valley floor portion of the watershed is a highly developed, urban environment with stream channels that have been highly modified from their original form.

The Guadalupe River watershed, and the Santa Clara Valley as a whole, exhibits a Mediterranean climate, with warm dry summers and mild wet winters. Precipitation occurs primarily from November through April, with minimal rainfall from May to October. Average rainfall varies throughout the watershed, with higher elevations on average exhibiting higher levels of precipitation than the valley floor (SCVHA, 2012). However, annual averages are often misleading in Mediterranean climates, as fairly frequent drought conditions and seasonal variation often leads to a wide range of precipitation outcomes depending on the given year. The percentage of precipitation carried away by streams as runoff also varies

depending on location within the watershed; depending on factors like topography, soil condition, depth to groundwater, and the density of urbanization. It is estimated that 16 to 24 percent of the precipitation that falls within the watershed runs off (SCBWMI, 2000).

Historically, most creeks in the Santa Clara Valley, and the San Francisco Bay Area as a whole, were intermittent and dry in their lower reaches during the summer months. Six major reservoirs exist within the watershed: Calero Reservoir on Calero Creek, Guadalupe Reservoir on Guadalupe Creek, Almaden Reservoir on Alamitos Creek, Vasona Reservoir, Lexington Reservoir, and Lake Elsman on Los Gatos Creek (SCBWMI, 2000). These reservoirs were all built for water storage and conservation, and all create impassable barriers to migrating fish species. Almaden Reservoir, located in the headwaters of Alamitos Creek, acts as a complete barrier to upstream fish passage. As patterns of water use changed, primarily through increased urban development and the requisite need for increased water consumption, many Santa Clara Valley creeks experienced increased summer flow. Today many creeks within the watershed are perennial, fed during summer months from reservoir releases, urban runoff, and sustained high groundwater levels (SCBWMI, 2000). These increased summer flows and associated high groundwater levels are reliant upon stored and imported water, released from reservoirs during summer months into many creeks that would otherwise be naturally dry (Smith, 2013). As a consequence, continuous summer flow is now maintained in the Guadalupe River.

Alamitos Creek, and main tributary Calero Creek, provides the hydrologic input and output to Almaden Lake, draining the 38-square mile Almaden Valley. Alamitos Creek merges with Guadalupe Creek to form the Guadalupe River, at a confluence just downstream of the Project site. The source of Alamitos Creek watershed is in the upper elevations of the Santa Cruz Mountains. It flows from its source into the approximately 60-acre Almaden Reservoir, completed in 1935 for water storage (SCBWMI, 2003). The reservoir receives waters from 12-square miles, including the small, perennial Herbert and Barrett creeks which empty into the southern end of the reservoir. Storms, or long wet periods in some water years, often produce more water than the small reservoir can contain. Excess water is directed into Calero Reservoir via the Almaden-Calero Canal (SCBWMI, 2000) or spills over the Almaden Dam spillway.

From Almaden Reservoir, Alamitos Creek flows northeast approximately five miles, to its confluence with Calero Creek. The stream then continues westward at a moderate slope for approximately 4-miles, draining into Almaden Lake. Downstream of Almaden Lake, the Alamitos Creek channel continues for approximately half a mile before joining with Guadalupe Creek, forming the Guadalupe River. Major floods occurred in the Alamitos and Calero Creek watershed in 1931, 1937, 1940, 1941, 1943, 1945, 1952, 1958, 1962, 1967, and 1968, and some caused significant damage (SCBWMI, 2000; 2003). As such, in the 1970s, approximately six miles of Alamitos Creek, from the Bertram Road Bridge downstream of its confluence with Guadalupe Creek, was widened and levees were built to provide flood protection (SCBWMI, 2000; 2003).

Just downstream from the Project site are a series of percolation ponds, managed by the District for groundwater recharge. A significant number of similar ponds are found throughout the watershed, constructed in locations where gravel and sand alluvium has been naturally deposited at or near ground level. Gravel and sand substrates, as opposed to clay, allow water to soak down most easily into the aquifers. These percolation ponds tend to contain marginal water quality conditions and are often colonized by nonnative fish; offering very little value to native fish species (Smith, 2013).

Guadalupe River Watershed Fish Community

Santa Clara Valley streams are home to approximately eleven (11) native and nineteen (19) nonnative species of fish (SCBWMI, 2000; Leidy, 2007; Smith, 2013). Over time the abundance and distribution of native species has been reduced and restricted through human impacts. Most headwater reaches and tributaries remain less disturbed than the lower valley floor streams, which typically abut much of the urban development found in South San Francisco Bay. In contrast to the warmer, impaired valley floor stream habitat, aquatic habitat in the high-elevation, forested headwaters provide cool temperatures, high dissolved oxygen levels, and ample riparian cover (SCBWMI, 2000). The construction of Vasona, Guadalupe, and Almaden Reservoirs in the 1930s isolated the upper watershed, and while native fish species persist in stream habitat above reservoirs, migratory fish can no longer use these tributaries for spawning. All low-elevation, mainstem streams and valley floor tributaries within the Study Area and vicinity have been significantly altered by human development. These developments include urbanization, water diversions, stream channelization, other flood-control projects, riparian vegetation removal, and increased rates of sedimentation (Moyle, 2002; Leidy, 2007). This altered habitat structure often coincides with changes to hydrology and water quality, which typically favors nonnative, invasive fish species (Moyle, 2002).

However, habitat alteration in the lower reaches of the Guadalupe River watershed has not affected the native fish community such that it significantly deviates from its historical composition. District stream sampling consistently records native species in higher abundances than invasive species throughout the Guadalupe River watershed including Alamitos Creek (SCVWD, 2019a). Within Alamitos Creek, native fish species including California roach, prickly sculpin, Sacramento sucker, and *O. mykiss* are all consistently recorded (SCVWD, 2019a).

Mercury

The historic New Almaden Quicksilver Mines were in the upper Guadalupe Watershed, approximately five miles from the Project site. Here, vast amounts of mercury were extracted to facilitate gold mining activities during California's gold rush era. The New Almaden Mine was the largest mercury mine in North America and contributed to the release of approximately 6,500 tons of mercury into local creeks and rivers during its years of operation, spanning from 1850 to 1970 (SCVWD, 2015). As a result of the extensive history of mining, large amounts of legacy mercury have been deposited throughout the watershed, including the Project site.

Due to the relative lack of hydrologic mixing within Almaden Lake, mercury and methylmercury (a form that is more toxic and more readily taken up into the food web) levels within the lake are of particular concern. As part of San Francisco Bay Regional Water Quality Control Board (RWQCB) total maximum daily load (TMDL) requirements, fish tissue sampling was conducted over multiple years within the Guadalupe River watershed to document the accumulation of mercury in the soft tissue of exposed fish as part of the Coordinated Monitoring Program. As part of the study, Central California roach (*Lavinia symmetricus symmetricus*) and other fish specimens were collected from Almaden Lake, Alamitos Creek, Guadalupe River, and a handful of reservoirs within the watershed and analyzed for mercury contamination.

To protect ecological and human health, the San Francisco Bay Basin Plan Amendment for mercury in the Guadalupe River watershed set forth numeric targets for mercury in fish tissue (AECOM, 2017):

- 0.05 mg/kg methylmercury fish average wet weight concentration in whole trophic level 3 fish 5 to 15 cm in length, and
- 0.1 mg/kg methylmercury fish average wet weight concentration in whole trophic level 3 fish 15 to 35 cm in length.

Methylmercury sampling within Almaden Lake and Alamitos Creek, upstream of the Project site, was conducted most recently in May 2016. Largemouth bass collected in Almaden Lake were found to contain a mean methylmercury concentration of 819 ng/g. California roach collected in Alamitos Creek at Harry Road and Graystone Lane also showed elevated methylmercury concentrations of 2,102 ng/g and 2,026 ng/g, respectively (AECOM, 2017).

Of the fish collected in lakes and reservoirs during this survey effort, fish collected from Almaden Reservoir had the highest methylmercury concentrations followed by fish collected from Guadalupe Reservoir, then Almaden Lake, and lastly Calero Reservoir. Of the fish collected from stream locations, fish collected from Alamitos Creek at Harry Road had the highest mercury concentrations, followed by fish collected from Guadalupe Creek at Meridian/Singletree and Alamitos Creek at Greystone, then Guadalupe River at Foxworthy/Virginia, and lastly Guadalupe River at Coleman (AECOM, 2017).

Project Site

Lacustrine Habitat

The waters of Almaden Lake can be characterized as lacustrine habitat; freshwater, open habitat that does not support abundant emergent vegetation and is not subject to tidal exchange. Almaden Lake was formed as a result of accidental inundation of a gravel-mining pit adjacent to the Alamitos Creek, when the levee separating the creek and the quarry breached. Almaden Lake has no groundwater connection and is currently only replenished by Alamitos Creek flows, direct precipitation, and limited stormwater runoff. Almaden Lake is approximately 32 acres in area, with a maximum depth of 47 feet. The elevation of the lake surface is raised approximately five feet when flashboards are installed at the Alamitos drop

structure downstream. Water flowing from Almaden Lake into the Guadalupe River is primarily surface water, warmer than lake bottom temperatures. Figure 3.E-1 displays average temperature data for 2017 to 2020, with data taken at its inlet at Alamitos creek at its outlet at the Guadalupe River.

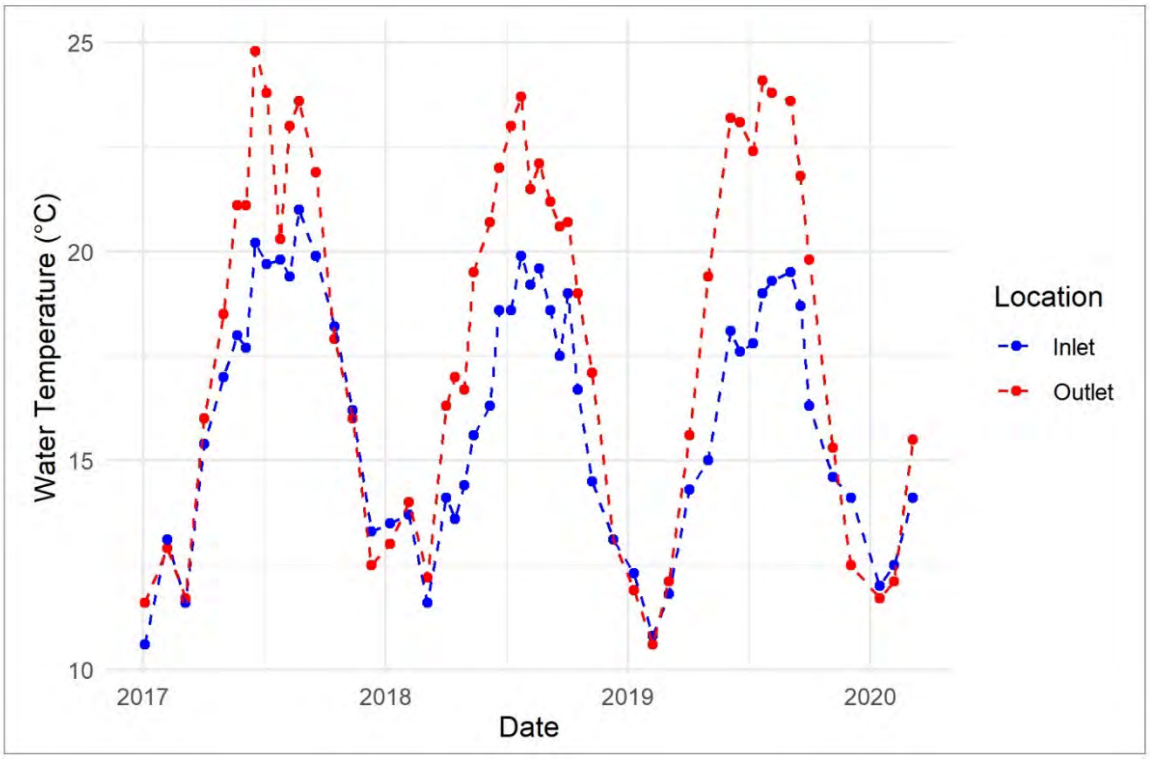


Figure 3.E-1
Average Temperatures at Lake Almaden

Native Sacramento sucker (*Catostomus occidentalis*), prickly sculpin (*Cottus asper*), and rainbow trout (*O. mykiss*) have the potential to enter Almaden Lake. However, trout are unlikely to occur within the lake during late-spring and summer months when the lake warms and dissolved oxygen reduces. Nonnative largemouth bass (*Micropterus salmoides*) and other sunfishes (*Lepomis sp.*) dominate the fish assemblage within the lake. Additional nonnative species including catfishes (*Ictalurus catus* and *I. nebulosus*), common carp (*Cyprinus carpio*), and inland silverside (*Menidia beryllina*) are also common (Smith, 2013).

Special-Status Species

Special-Status Fish Species

Special-status fish species are those species legally protected or are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. Special-status fish species include:

- Species listed or proposed for listing as threatened or endangered under the Federal Endangered Species Act (FESA) or California Endangered Species Act (CESA);

- Species identified by NMFS or CDFW as species of special concern; and
- Species fully protected in California under the California Fish and Game Code.

Species Assessed in Detail

The special-status fish species presented in Table 3.E-1, along with the regulatory basis for their status, have a Moderate to High potential to occur within the Study Area and are described in detail below:

- Central California Coast steelhead Distinct Population Segment (DPS)
- Central Valley fall-run Chinook salmon Evolutionarily Significant Unit (ESU)
- Pacific lamprey

TABLE 3.E-1
SPECIAL-STATUS FISH SPECIES WITH POTENTIAL TO OCCUR
IN THE ALMADEN LAKE STUDY AREAS

Species	Status[1]		Habitat Requirements	Potential to Occur in the Almaden Lake Improvement Project Site
	NMFS	CDFW		
California Central Coast steelhead DPS *Oncorhynchus mykiss*	T	--	Requires cold, freshwater streams with suitable gravel for spawning. Rears in rivers and tributaries to the San Francisco Bay.	Moderate. Known to occur in multiple South Bay streams including the Guadalupe River and Alamitos Creek. Likely present in all accessible reaches of these streams (Leidy et al. 2005a; SCVWD, 2018).
Central Valley fall-run Chinook salmon ESU *Oncorhynchus tshawytscha*	--	SSC	Requires cold, freshwater streams with suitable gravel for spawning. More common in Central Valley streams, occasionally rears in tributaries to San Francisco Bay.	Moderate. Known to occur in small numbers in multiple South Bay streams including the Guadalupe River and Alamitos Creek (Leidy 2007). Genetic analysis and presence of coded wire tags has determined that Chinook in South Bay streams are derived hatchery stock (Moyle, 2002; Garcia-Rossi and Hedgecock, 2002).
Pacific lamprey *Entosphenus tridentatus*	--	SSC	Requires cool, freshwater streams with suitable gravel for spawning. Rears in rivers and tributaries to San Francisco Bay.	Moderate. Known to occur in multiple South Bay streams including the Guadalupe River and Alamitos Creek (Leidy 2007). This species' status is poorly documented, and its relative abundance in streams is unknown.

ACRONYMS:

CDFW = California Department of Fish and Wildlife; DPS = Distinct Population Segment; ESU = Evolutionarily Significant Unit; NMFS = National Marine Fisheries Service.

[1] Legal Status Definitions:

Federal Listing Categories (NMFS):
T Threatened (legally protected)
E Endangered (legally protected)

State Listing Categories (CDFW):
SSC Species of Special Concern (no formal protection)

SOURCE: Moyle 2002, Leidy 2007, Smith 2013

Fish Species Accounts

Central California Coast steelhead DPS (*Oncorhynchus mykiss*)

Steelhead have a highly flexible life history and may follow a variety of life-history patterns including residents (non-migratory, often referred to as rainbow trout) and individuals that migrate to the open ocean (anadromous). Steelhead are unique among Pacific salmon as they are iteroparous in that ocean migrating individuals may return to the ocean after spawning and return to freshwater to spawn one or more times.

Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles all rear in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing to adults. Status reviews of steelhead in California document much variation in life history (Shapovalov and Taft, 1954). Although variation occurs, in coastal California, steelhead usually live in freshwater for one to two years, then spend an additional two or three years in the ocean before returning to their natal stream to spawn. Adult steelhead typically migrate to tributaries of San Francisco Bay between December and April, peaking in January and February (Moyle et al., 2008). Monitoring at the Masson Fishway on Guadalupe Creek suggests late-February and early March are the peak migration months for adult steelhead in Guadalupe watershed (SCVWD, 2009). Adult steelhead are generally not present in streams between May and October. During the adult migration season, the timing of upstream immigration typically correlates with seasonal high flows and associated lower water temperatures.

Steelhead select spawning sites with gravel substrate and with sufficient flow velocity to maintain circulation through the gravel and provide a clean, well-oxygenated environment for incubating eggs. Typically, sites with preferred features for spawning occur most frequently in the pool tail/riffle head areas where flow accelerates out of the pool into the higher gradient section below. In such an area, the female will create a pit, or redd, by undulating her tail and body against the substrate.

Steelhead fry generally rear in edgewater habitats and move gradually into pools and riffles as they grow larger. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation. Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles.

Temperature is also an important factor for steelhead/rainbow trout, particularly during the over-summer rearing period (Moyle, 2002). The upper lethal temperature for Pacific salmonids is in the range 23.9 to 25 °C for continuous long-term exposure. However, steelhead can survive for short periods at elevated temperatures (26-27 °C), especially if abundant food and dissolved oxygen exist (Moyle, 2002).

Juvenile steelhead emigrate episodically from natal streams during fall, winter, and spring high flows, (Fukushima and Lesh, 1998). Emigrating CCC steelhead use tributaries of San Francisco Bay and portions of the San Francisco Bay for rearing and as a migration corridor

to the ocean. Although data regarding the emigration timing of steelhead smolts from Alamitos Creek and the Guadalupe River watershed is limited, steelhead smolts in other streams within the DPS including those draining to San Francisco Bay, typically emigrate from March through June (Fukushima and Lesh, 1998).

Status in the Study Area

Historically, the Guadalupe River watershed supported a steelhead run, although due to the aridity of the system it was likely smaller than those supported in the larger San Francisco Bay tributaries like Alameda Creek (Leidy et al., 2005a). The urbanization in the lower reaches of the watershed, along with construction of barriers to upstream passage has reduced the size of the historic run.

The District conducted five years of monitoring of passage conditions of the Alamitos and Masson Fishways aimed at documenting the effectiveness of fish passage through both facilities. To conduct the monitoring, the District used a Vaki Riverwatcher, a computer-based fish counter which captures silhouettes of fish as they pass through the Fishways. The fish counter was deployed in the Alamitos Fishway from 2003 to 2006 and in the Masson Fishway from 2006 to 2008. In all years of the study steelhead were documented moving upstream through both Fishways, peaking in 2006-07 monitoring year when 42 adult steelhead were recorded moving upstream through the Masson Fishway. In that same year 14 adult and 5 juvenile steelhead were recorded moving downstream through the Masson Fishway (SCVWD, 2009).

The District reinitiated Vaki monitoring of the Alamitos Fishway in 2018. In the 2018 monitoring year, 14 adult steelhead were recorded moving upstream and 17 were recorded moving downstream through the Alamitos Fishway (SCVWD, 2019b). In addition, there were 324 detections of juvenile steelhead (153 upstream and 171 downstream), though the exact number of individuals is unknown. Vaki monitoring resumed for the 2018-2019 monitoring year in which 79 juvenile steelhead were detected; 42 were recorded moving upstream and 37 were moving downstream (SCVWD, 2020).

District survey records on Alamitos Creek, upstream of Almaden Lake, have historically recorded individual steelhead throughout the stream reach below the reservoir (Leidy et al., 2005a). Recent surveys, conducted in October 2018 at four locations on Alamitos Creek, consistently recorded *O. mykiss* throughout the reach upstream of Almaden Lake (SCVWD, 2019a). These surveys suggest that Alamitos Creek likely supports successful reproduction and summer rearing in most water years.

While water quality and temperature constraints most likely prohibit the persistence of steelhead within Almaden Lake, the surrounding reaches of Guadalupe Creek, Guadalupe River, and Alamitos Creek all sustain steelhead populations. Additionally, during migration periods adult and juvenile steelhead move through Almaden Lake to reach spawning habitat upstream, or San Francisco Bay downstream. As such, individual juvenile steelhead have the potential to occur year-round within the vicinity of the Project site.

Central Valley fall-run Chinook salmon ESU (*Oncorhynchus tshawytscha*)

Chinook salmon are the largest species of Pacific salmon (Moyle, 2002). Chinook are anadromous (a migratory fish that is born in fresh water and spends a portion of its life in the sea before returning to fresh water to spawn), but unlike steelhead, Chinook salmon are semelparous (i.e., they die following a single spawning event). Chinook salmon populations, and all Pacific salmonids, are divided into Evolutionarily Significant Units depending on their life-history strategies. Life-history strategies are differentiated by the timing of immigration, a fact implicit in the name of the different runs according to their spawning migration.

Adult Central Valley (CV) fall-run Chinook salmon enter rivers and streams in the late-summer and fall months as mature individuals, moving quickly upstream to accessible spawning habitat. Peak spawning occurs within several weeks of freshwater entry, typically from October to November, but often continuing into December and January (Yoshiyama et al., 1998). Juveniles spend about 1 to 7 months in the river and estuary systems before entering the ocean (Michel et al. 2013). As with steelhead, downstream migration is typically correlated with storm events and increased flows (Moyle, 2002).

Chinook salmon have very similar spawning requirements to those described above for steelhead, requiring cool, swift, well-oxygenated stream habitat. However, Chinook use the largest substrate of any California salmonid for spawning, preferring a mixture of large gravel and small cobble. While rearing in stream habitats, Chinook salmon feed on aquatic and terrestrial invertebrates, in intertidal habitats salmon feed on amphipods, insects, and fish larvae. During the oceanic life stage, during which most growth occurs, Chinook salmon feed on fish, large crustaceans, and squid (Moyle, 2002).

Throughout its range, the largest factor limiting this species is the presence of migration barriers that prevent access to spawning habitat. Water diversions further reduce freshwater habitat quality throughout the range of these species. Other threats to Chinook salmon include agricultural operations, forestry operations, gravel extraction, illegal harvest, streambed alteration, unscreened or substandard fish screens on diversions, suction dredging, urbanization, water pollution, potential genetic modification in hatchery stocks resulting from domestication selection, incidental mortality from catch-and-release fishing, climatic variation leading to drought, flooding, variable ocean conditions, and predation (Moyle, 2002).

Status in the Study Area

While not present in the records of early biologists, beginning as early as 1986, Chinook salmon are observed entering the Guadalupe River to spawn. The lack of historical records, coupled with the salmon's attempts to enter the river months before stream flows and water temperatures are suitable for spawning (as early as July in some years), indicate that the runs are comprised of fall-run strays from Central Valley streams. However, in 1998 the District collected Chinook smolts during spring trapping on the lower Guadalupe River, suggesting that successful reproduction has occurred (Smith, 2013). Results of genetic analyses indicate that Chinook salmon from the Guadalupe River are most closely related to Central Valley and stocks with the greatest similarities to fish from the Feather River (Garcia-

Rossi and Hedgecock, 2002). The recovery of individuals with adipose fin clips and coded fire tags further support the claim that these salmon are of hatchery origin.

As part of the District Fishway study described above, Chinook salmon were also observed moving throughout the system. At Alamitos Fishway, during the 2004-05 monitoring season, 27 adult Chinook were observed moving upstream through the Fishway. During that same survey season, 9 adult Chinook were observed moving downstream through the Alamitos Fishway (SCVWD, 2009).

As with steelhead, water quality conditions within Almaden Lake most likely prohibit any extended presence of Chinook salmon. However, redds and spawning Chinook adults have been observed in Guadalupe and Alamitos Creek near the Project site (SCVWD, 2019). As such, individual CV fall-run Chinook salmon have the potential to occur seasonally within the vicinity of the Project site. It must be noted that no portion of the Guadalupe Watershed is designated as critical habitat for CV fall-run Chinook salmon, and no stream systems within Santa Clara County are included on range maps for the species.

Pacific lamprey (*Entosphenus tridentatus*)

Pacific lamprey are the largest of the native lamprey species with adults commonly reaching over 40 cm in total length. They are anadromous fish, rearing in freshwater streams for approximately 5 to 7 years before migrating to the ocean (Moyle, 2002). During their ocean phase, approximately three years in length, they feed parasitically on fish larger than themselves, consuming the body fluids of a variety of species.

Adults return to freshwater during spawning migrations which typically take place between early March and late June, but can vary greatly depending on the system (ENTRIX, 1996; Moyle, 2002). Lamprey spawning habitat preference and behavior is similar to the spawning patters of salmonids, and steelhead in particular, as adults are capable, albeit unlikely, of multiple spawning events (Moyle, 2002). Lamprey prefer low-gradient, high oxygenated riffle environments in which both sexes construct nests in which to lay and fertilize eggs. After hatching, larval lamprey (commonly referred to as ammocoetes), burrow into soft stream sediments tail first and begin filter feeding on organic matter near the substrate (Gunkel et al., 2009). The ammoecete phase lasts for approximately 5 to 7 years before individuals are large enough, and have undergone the requisite size and physiological changes to tolerate salt water, to migrate to the ocean. Downstream migration is typically timed with high flow events in the winter and spring. As mentioned above, instream habitat preferences of Pacific lamprey are very similar to salmonids, as they prefer streams with cold, clear water, with temperatures in the range of 10 to 18 °C (Meeuwig et al., 2005).

As with many native fish species, the restriction in access to historic spawning reaches in natal streams has caused a decline in the overall population.

Status in the Study Area

Pacific lamprey are known to occur throughout the Guadalupe River watershed, primarily within the Guadalupe River but have also been observed within Alamitos Creek upstream of

Almaden Lake (Smith, 2013). During 2004 monitoring of an out-migrant trap on the lower mainstem Guadalupe River more than 60 adult Pacific lamprey were recorded by the District biologists (Leidy 2007). Additionally, as part of the Alamitos and Masson Fishway passage studies, adult Pacific lamprey were observed in 2008 passing through the Masson Fishway. This observation was confirmed through surveys of the reaches upstream of the Masson Fishway in which adult Pacific lamprey were recorded by District staff (SCVWD, 2009).

As Pacific lamprey have been recorded in recent years within close proximity to the Project site, they do have the potential to occur year-round. Due to water quality constraints, primarily increased temperature levels within Almaden Lake, the likelihood of lamprey (both adults and ammocoetes) occurring within the Project site is low.

Passage

The Guadalupe River, Guadalupe Creek, and Alamitos Creek are known to support anadromous fish species including Central California Coast (CCC) steelhead, Central Valley fall-run Chinook salmon and Pacific lamprey. The District modified the 13-foot Alamitos drop structure and installed a fish ladder in 1999, which now provides access to over sixteen miles of salmonid spawning and rearing habitat in Guadalupe and Alamitos Creeks. This spawning and rearing habitat had been off limits to migrating salmonids at least since the 1930s when water diversions began at the Alamitos drop structure (SCBWMI, 2000). As part of the Guadalupe River Flood Control Project and other District operations, fourteen major fish passage improvements have occurred in the watershed since 1994. These improvements include a major geomorphic restoration project, installation of large woody debris, and weir retrofits. (Smith, 2013). Additionally, Masson Dam, a diversion structure on Guadalupe Creek upstream of the confluence with Alamitos Creek, was laddered in 2000 (URS, 2012). Adult migrating salmonids and lamprey must pass through Almaden Lake to reach spawning habitat in Alamitos and Calero creeks. Likewise, juvenile salmonids and lamprey must pass through the lake during out-migration to the ocean (SCVWD, 2015).

Almaden Lake and its hydrologic connectivity with Alamitos Creek create a potential non-physical barrier to fish passage. Impaired water quality, risk of entrainment, and predation pressure from nonnative predatory fish species within Almaden Lake may prevent the successful migration of native migratory fish upstream or downstream through the watershed. Due to the unnaturally varied depths within the lake, and the lake's large surface area to volume ratio, surface temperatures of the lake are elevated compared to the upstream Alamitos Creek source water. These elevated seasonal water temperatures present a potential thermal impediment to steelhead and other anadromous fish (SCBWMI, 2003). However, during migration season, when anadromous fish are most likely to be moving through Almaden Lake, water temperatures are not likely to be high enough to create a thermal barrier to passage. Tracking studies conducted by the District have shown juvenile fish traveling from Guadalupe Creek through Almaden Lake into Alamitos Creek (Leal pers. comm. 2019).

However, during summer months, seasonal warm temperatures extend downstream of the lake into the Guadalupe River, as warm water released from the lake travels downstream.

The elevated temperatures and lacustrine habitat in the lake also supports nonnative fish species that potentially prey on steelhead and other native species. Entrainment of anadromous fish in the lake is also possible, making it difficult for steelhead and other anadromous fish to find the source stream at the upstream end of the lake (SCVWD, 2013).

3.E.2 Regulatory Setting

This subsection briefly describes federal, state, and local regulations, permits, and policies pertaining to biological resources and wetlands as they apply to the Project.

Federal Regulations

Federal Endangered Species Act

Under FESA, the Secretary of the Interior and the Secretary of Commerce have joint authority to list a species as threatened or endangered (16 U.S. Code [USC] 1533[c]). The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over plants, wildlife, and resident fish, while NMFS has jurisdiction over anadromous fish and marine fish and mammals. On January 5, 2006, the CCC steelhead DPS, including all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers, were listed as threatened under FESA by NMFS (71 FR 834).

Magnuson-Stevens Fisheries Conservation Act

In response to growing concern about the status of U.S. fisheries, the Sustainable Fisheries Act of 1996 (Public Law 104-297) was passed by Congress to amend the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265), the primary law governing marine fisheries management in the federal waters of the United States. Under the Sustainable Fisheries Act, consultation is required by NMFS on any activity that might adversely affect designated Essential Fish Habitat (EFH). EFH includes those habitats that fish rely on throughout their life cycles. It encompasses habitats necessary to allow sufficient production of commercially valuable aquatic species to support a long-term sustainable fishery and contribute to a healthy ecosystem.

State Regulations

California Endangered Species Act

Pursuant to CESA and Section 2081 of the California Fish and Game Code, a permit from CDFW is required for projects that could result in take of a state-listed threatened or endangered species. There are no fish species state listed as threatened or endangered under CESA in the Almaden Lake Study Area.

California Fish and Game Code Sections 1602 and 5515

Under Sections 1600–1616 of the California Fish and Game Code, the CDFW regulates activities that would substantially divert, obstruct the natural flow of, or substantially change

rivers, streams, and lakes through the issuance of a lake or Streambed Alteration Agreement. The jurisdictional limits of the CDFW are defined in Section 1602 of the Fish and Game Code as the "bed, channel, or bank of any river, stream, or lake". Activities that would "deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake" are prohibited by the CDFW unless a streambed alteration agreement is issued.

Local Plans and Policies

City of San José Envision Plan (2011)

The *Envision San José 2040 General Plan* sets forth a vision and a comprehensive road map to guide the City's continued growth through the year 2040. The following policies within the Plan relate to biological resources potentially affected by the Project.

> ER-2.4. When disturbances to riparian corridors cannot be avoided, implement appropriate measures to restore, and/or mitigate damage and allow for fish passage during construction.
>
> ER-4.1. Preserve and restore, to the greatest extent feasible, habitat areas that support special-status species. Avoid development in such habitats unless feasible alternatives exist and mitigation is provided of equivalent value.
>
> ER-9.5. Protect groundwater recharge areas, particularly creeks and riparian corridors.

Santa Clara Valley Water District Stream Maintenance Guidelines (2014)

The District Stream Maintenance Guidelines provide the framework for the District's Stream Maintenance Program (SMP). The SMP is a long-term and ongoing District program, initially developed in 2001 to define and improve the management and maintenance of flood control channels and streams under the District's authority. The SMP establishes programmatic guidance for the District's routine stream maintenance activities to facilitate avoidance and minimization of environmental impacts. The SMP also provides the organizational framework to oversee routine maintenance activities, keeping the Program compliant with the terms and conditions of its permits. All in-channel work would be consistent with the impact avoidance measures and BMPs designated under the SMP, as well as, explicit recommendations to minimize impacts of special-status fish species made by NMFS in the 2014 Biological Opinion (BO) issued for the program.

3.E.3 Impacts and Mitigation Measures

Significance Criteria

Consistent with the CEQA Guidelines, the Project would have a significant impact related to fisheries resources if the Project were to:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the CDFW, USFWS, or NMFS;

- Interfere substantially with the movement of any native resident or migratory fish species; or;
- Conflict with any local policies or ordinances protecting fisheries resources or with an adopted Habitat Conservation Plan or other conservation plan relevant to fish or fisheries.

Approach to Analysis

Avoidance and Minimization Measures Incorporated into the Project

Avoidance and minimization measures are those parameters that have been built into the design of the Project and are committed to as part of Project implementation. These measures are included in the Project Description (Section 2.E.1) of this report, but where appropriate, the specific measures related to the impact evaluations are also summarized below.

District Best Management Practices

The following avoidance and minimization measures are contained in the District's Best Management Practices (BMP) Handbook (SCVWD, 2014a), and have been incorporated into the Project. These measures would generally help to reduce the intensity of impacts to fisheries resources associated with the Project, in accordance with District policy.

Best Management Practices

BI-2. Minimize Impacts to Steelhead.

BI-3. Remove Temporary Fill.

BI-9. Restore Riffle/Pool Configuration of Channel Bottom.

HM-7. Restrict Vehicle and Equipment Cleaning to Appropriate Locations

HM-8. Ensure Proper Vehicle and Equipment Fueling and Maintenance

HM-9. Ensure Proper Hazardous Materials Management

HM-2. Minimize Use of Pesticides

HM-4. Comply with All Pesticide Usage Requirements

HM-5. Comply with Restrictions on Herbicide Use in Upland Areas

HM-6. Comply with Restrictions on Herbicide Use in Aquatic Areas

Santa Clara Valley Habitat Plan

Although the Santa Clara Valley Habitat Plan (2012) (SCVHP) does not cover fish species, the following avoidance and minimization measures are also included as part of the Project to benefit fish species and their habitats; a general discussion of these measures is presented in the SCVHP.

Habitat Plan Conditions

Condition 1. Avoid Direct Impacts on Legally Protected Plant and Wildlife Species

Condition 3. Maintain Hydrologic Conditions and Protect Water Quality

Condition 4. Avoidance and Minimization for In-Stream Projects

Condition 5. Avoidance and Minimization Measures for In-Stream Operations and Maintenance

Condition 11. Stream and Riparian Setbacks

Condition 12. Wetland and Pond Avoidance and Minimization

Habitat Plan Avoidance and Minimization Measures

1. Minimize the potential impacts on covered species most likely to be affected by changes in hydrology and water quality.

15. If native fish or non-covered, native aquatic vertebrates are present when cofferdams, water bypass structures, and silt barriers are to be installed, a native fish and aquatic vertebrate relocation plan shall be implemented when ecologically appropriate as determined by a qualified biologist to ensure that significant numbers of native fish and aquatic vertebrates are not stranded.

    Prior to the start of work or during the installation of water diversion structures, native aquatic vertebrates shall be captured in the work area and transferred to another reach as determined by a qualified biologist. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Capture and relocation of aquatic vertebrates is not required at individual project sites when site conditions preclude reasonably effective operation of capture gear and equipment, or when the safety biologist conducting the capture may be compromised.

    Listed species not covered by the Habitat Plan will not be relocated without the appropriate permits and authorizations from the correct agencies.

    Relocation of native fish or aquatic vertebrates may not always be ecologically appropriate. Prior to capturing fish and/or vertebrates, the qualified biologist will use factors, including site conditions, system carrying capacity for potential relocated fish, and flow regimes (e.g., if flows are managed) to determine whether a relocation effort is ecologically appropriate. If so, the following factors will be considered when selecting release site(s):

    1. Similar water temperature as capture location;
    2. Ample habitat availability prior to release of capture individuals;
    3. Presence of other same species so that relocation of new individuals will not upset the existing prey/predation function;
    4. Carrying capacity of the relocation location;
    5. Potential for relocated individual to transport disease; and
    6. Low likelihood of fish reentering work site or becoming impinged on exclusion net or screen.

    Proposals to translocate any covered species will be reviewed and approved by the Wildlife Agencies.

20. Conditions for fish passage shall be met as long as the diversion;

    1. Maintains contiguous flows through a low flow channel bed or an artificial open channel,

2. Presents no vertical drops exceeding six (6) inches and follows the natural grade of the site,
3. Maintains flow at the downstream end of the diversion within 1 cubic foot per second (cfs) of flows at the upstream end, and
4. Maintains adequate water depths in the bypass channel to ensure no impediment to upstream or downstream movement of fish is imposed.

44. Maintenance of natural stream characteristics consistent with the stream section, such as riffle-pool sequences, riparian canopy, sinuosity, floodplain, and natural channel bed, will be incorporated into the Project design.

78. In-stream projects occurring while the stream is flowing must use appropriate measures to protect water quality, native fish and covered wildlife species at the Project site and downstream of the Project site.

Impact Summary

Table 3.E-2 provides a summary of fisheries resource impacts by implementation phase (construction and operations).

TABLE 3.E-2
SUMMARY OF FISHERIES RESOURCES IMPACTS

Impact Statement	Construction	Operation
Impact 3.E-1: Construction and operation of the Project would have a substantial effect on special-status native fish and their aquatic habitat in Almaden Lake and Alamitos Creek.	LSM	LS
Impact 3.E-2: Construction and operation of the Project would not interfere substantially with the movement or migration of native fish species, including Central California Coast steelhead DPS.	LS	LS
Impact 3.E-3: The Project would not conflict with any local policies or ordinances protecting fisheries resources or with an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan relevant to fish or fisheries.	LS	LS

LS = Less than significant
LSM = Less than significant with mitigation

Impacts and Mitigation Measures

Impact 3.E-1: Construction and operation of the Project would have a substantial effect on special-status native fish and their aquatic habitat in Almaden Lake and Alamitos Creek. (Less than Significant with Mitigation)

Construction Impacts

All in-water construction activities would occur outside of the normal rainy season, typically between June 1 and October 15, when flows in Alamitos Creek are at their lowest, and special-status anadromous fish species are least likely to occur within the Project site. All work will be done consistent with BMP BI-2, which prohibits use of equipment in live creeks, and SCVHP Avoidance and Minimization Measures 1,15, 20, 44, and 78 which require the

minimization of impacts from changes in hydrology and water quality, implementation of a native fish and aquatic vertebrate relocation plan, captured native aquatic vertebrates be transferred to another appropriate location, fish passage be maintained as feasible, and nature stream characteristics be incorporated into the design.

As discussed in Section 2.E.2, Construction Phases, once the lake water level is reduced, boat based electrofishing would commence to capture as many fish from the lake as possible. Prior to draining the western portion of Almaden Lake, the inlet and outlet of the lake would be isolated using block nets to avoid any movement of fish into the lake. Due to the nature and amount of in-water work required by the Project, construction activities, including fish relocation activities could result in the accidental take of special-status native fish even with the implementation of project elements, BMPs, and Avoidance and Minimization Measures discussed above. This would be a significant impact.

To minimize the severity of this impact, the District would implement Mitigation Measure 3.E-1 (Native Fish Capture and Relocation). This measure requires the preparation and implementation of a capture and relocation plan with specific components to minimize impacts to steelhead, salmon, and lamprey, should any be present, during electrofishing, capture and relocation. With this measure in place the risk of take of special-status species would be minimized to a less than significant level with mitigation.

Water and Sediment Quality Impacts

Installation of a sheet-pile cofferdam prior to dewatering has the potential to result in short-term, temporary disturbance and resuspension of benthic sediments. Sediment resuspension has the potential to increase the exposure of harmful chemicals, in particular methylmercury, sequestered in the sediment to special-status fish species in the immediate area, and result in adverse water quality and biological effects (Tetra Tech & Wetlands and Water Resources, 2013). Suspended sediments in the water column can lower levels of dissolved oxygen, increase concentrations of suspended solids, and possibly release chemicals present in the sediments into the water column. However, increased turbidity levels would be relatively short-lived and generally confined to within a few hundred feet of the activity. After initially high turbidity levels, sediments would disperse and deposit, and background levels would be expected to be restored within hours of disturbance.

Construction-related contaminants such as fuels, oils, hydraulic fluids, and other chemicals/compounds used in construction activities can be introduced accidentally through spills into waterways directly, or incrementally through surface runoff from haul routes and staging areas. Contaminants in sufficient concentrations could be toxic to fish and prey organisms occupying adjacent aquatic habitats or could alter oxygen diffusion rates and cause acute and chronic toxicity to aquatic organisms, thereby reducing growth and survival and possibly causing mortality of special-status native fish. All in-water work would occur during the specified in-water work window during the dry season, the District would implement BMPs HM-7, HM-8, HM-9 and a Stormwater Pollution Prevention Plan (SWPPP) would be developed to implement both sediment and erosion control measures, with other measures to control chemical contaminants. The SWPPP (discussed in greater detail in

Section 3.K, Hydrology and Water Quality - see specifically Section 3.K.3, Statewide General Permit for Construction Activity). With the in-water work window, District BMPs, development and implementation of a SWPPP, and compliance with the General Permit would protect water quality by working within the dry season, ensuring appropriate sediment and erosion control measures and containment of chemical contaminants, the Project would have a less than significant impact on special-status native fish and their aquatic habitat.

Underwater Noise Impacts

A sheet pile cofferdam would be installed with a vibratory pile driver prior to draining of the lake and fish relocation. Vibratory pile drivers produce sound waves that can be perceived and are potentially harmful for fish. Hydrostatic pressure waves and vibration generated by pile driving can adversely affect all life stages of fish. Hydrostatic pressure waves have the potential to rupture the swim bladders and other internal organs of all life stages of fish, and could permanently injure their inner ears and lateral line organs (Hastings and Popper, 2005). These injuries could reduce the ability of fish (including special-status fish species) to orient in the water column, capture prey, and reduce the ability of fish to avoid predators (CalTrans, 2015).

An interagency working group, including members from NMFS and USFWS, has established interim criteria for evaluating underwater noise impacts from pile driving on fish (Fisheries Hydroacoustic Working Group, 2008). This working group identified a peak sound pressure level of 206 decibels (dB) and an accumulated sound exposure level (SEL)[1] of 187 dB as thresholds for injury to fish. For fish weighing less than 2 grams, the accumulated SEL threshold is reduced to 183 dB. Although there has been no formal agreement on a "behavioral" threshold, NMFS uses 150 dB as the threshold for adverse behavioral effects (CalTrans, 2015).

Based on empirical data from actual construction sites, peak sound pressures from installing a sheet pile cofferdam with a vibratory driver are estimated to be below thresholds for injury and/or mortality.

Sheet piles installed with vibratory driver (CalTrans 2007; Table 1.2-2 from compendium data):

- Peak[2] = 175 (typical) -182 (loudest) dB
- Sound exposure level (SEL) = 160-165 dB

Estimated pressures are above thresholds for behavioral effects (150 dB threshold); however, behavioral effects on special-status native fish are not expected to be an issue due to timing restrictions (seasonal work window and only conducting pile driving during daylight

[1] Sound exposure level (SEL) is defined as the constant sound level acting for 1 second, which has the same amount of acoustic energy as the original sound. Expressed another way, the sound exposure level is a measure of the sound energy in a single pile driver strike. Accumulated SEL ($SEL_{accumulated}$) is the cumulative SEL resulting from successive pile strikes. $SEL_{accumulated}$ is based on the number of pile strikes and the SEL per strike; the assumption is made that all pile strikes are of the same SEL.

[2] Peak sound pressure refers to the highest absolute value of a measured waveform (i.e., sound pressure pulse as a function of time).

hours), which would limit the number of special-status fish present in the area. For most species with migratory life stages that have the potential to be present, only a small portion of the population is expected to be exposed to the increased underwater sound levels because these increases generally would occur outside of peak migration periods. Therefore, bBased on ~~a review of~~ the construction techniques described above (e.g., use of vibratory sheet pile drivers and in-water work window), NMFS threshold criteria for harm and injury, and empirical data from actual construction sites, underwater sound effects on fish species are likely to be low and this impact would be less than significant.

Summary

The installation of sheet piles and the draining of the lake could result in impacts to special-status fish; although low numbers of these species are expected to be in the Project area due to the timing of construction activities (in the dry season and outside of migration periods) and the low habitat value of the existing lake. The use of vibratory pile drivers for the sheet pile would minimize impacts from underwater noise to less than harmful levels. Fish capture and relocation activities could have a significant impact to special-status species, but would be minimized with the implementation of Mitigation Measure 3.E-1. Once draining of the lake is complete, aquatic species would be fully excluded from the construction area and there would be no further impacts to special-status fish species from construction.

Operational Impacts

The Project would alter the structure of existing habitat within the Project site. Overall post-Project conditions should provide substantial benefit to native fish species through the restoration of Alamitos Creek to a more natural state with a stable geomorphic channel design comprised of a riffle-pool-run pattern, designed to neither aggrade nor degrade. The slope and riffle-pool-run pattern would be similar to the channel located immediately upstream of the Project site. This pattern would stretch the length of the restored creek. Existing water quality and hydrologic concerns that may limited anadromous species from moving through the lake, including barriers of temperature, dissolved oxygen, and flow would be ameliorated by the Project.

Native fish would not be re-introduced into the separated lake. Almaden Lake water quality would continue to be monitored by the City for bacteria and by District staff for mercury and methylmercury concentrations.

Maintenance Activities

Future maintenance within the Project site would likely consist of vegetation management on the levee, repair of any erosion along the banks of the Alamitos Creek channel, and removal of sediment deposition in the channel Sediment removal or erosion repair could require a variety of heavy equipment, as well as a temporary cofferdam if flows must bypass the maintenance site. The District anticipates periodic sediment removal downstream of the lake, as a continuation of existing practices ~~of 5,000 cubic yards in the Project footprint every 10 years. Excavated sediment would be reused on site where feasible, or would be disposed of at a landfill or other suitable site, in accordance with applicable disposal requirements.~~ All sediment removal activities would be conducted consistent with applicable BMPs designated

for in-stream sediment removal and bank stabilization operations as described in the District's Stream Maintenance Guidelines and the corresponding NMFS BO for the District Stream Maintenance (2014). ~~Any sediment removed would be tested for contaminants, including mercury, before reuse would occur.~~

Vegetation management could include the use of pesticides to manage emergent and near-water invasive vegetation. The District would implement BMPs HM-2, HM-4, HM-5, and HM-6 any time pesticides would be necessary. These measures limit the amount and timing of pesticide use to protect human health and the environment. Although the use of pesticides could result in water quality degradation and thus to special-status fish, particularly if pesticides come in direct contact with water or rainfall the implementation of BMPs would ensure that impacts related to the use of pesticides is minimized.

As future maintenance in the channel would be limited and be subject to District BMPs, impacts from maintenance to special-status fish would be less than significant.

Native fish would be excluded from the separated lake in the future and maintenance activities associated with the lake would have no impact on special-status fish.

Mitigation Measures

Mitigation Measure 3.E-1: *Native Fish Capture and Relocation*. The District and/or contractor shall expand and implement the fish relocation plan as required under SCVHP Avoidance and Minimization Measure 15 consistent with the following conditions:

- Before fish rescues are attempted resource agency authorization shall be obtained.
- Upon arrival at the site, qualified biologists shall determine the extent of the dryback and if there shall be any immediate or foreseeable impacts to fish and wildlife. This includes a reconnaissance survey of the dryback zone to establish an operational response.
- Before dewatering can begin, the following fish relocation elements shall be determined:
  - *Staging Area*: Identify staging areas in the dryback zone. Sites should be selected on the basis of proximity and access to the dryback zone and safe operation of the equipment.
  - *Relocation Sites*: Priority shall be given to close proximity to the dryback zone within the same stream; if it is determined by a qualified on-site biologist that no suitable site within the stream is available, then "second choice" locations within the watershed shall be selected. In all cases, the closest site that is likely to result in a successful rescue shall be used.
  - *Transportation Routes*: Transport routes for rescued fish species shall be determined in advance.
  - *Downstream vs. Upstream*: Species rescued shall be transported downstream if possible and upstream only for short distances if downstream sites are not feasible.

  - *Disease Consideration*: Fish shall not be moved upstream over substantial barriers or long distances upstream to guard against disease transmission.

- *Salmonids*: If salmonids are encountered during relocation, they should be moved upstream to a location of perennial running water or the best available habitat determined by a qualified biologist. Collection and transport methods shall be determined per site conditions. Methods shall also be selected to maximize efficiency of collection effort while minimizing handling and transport time and stress. Creek water from the site shall be used in all containers. Local transport of fish may be executed by various methods including:

  - *Net transfer*: Appropriate for short distances where rapid transfer is possible.

  - *Live car*: Appropriate for temporary holding in stream and short distances where rapid transfer is required.

  - *Bucket*: Appropriate for temporary holding and transport over short-medium distances. Holding time should be minimized if possible or supplemental aeration supplied.

  - *Aerated cooler*: Appropriate for temporary holding and transport of long distances. Temperature shall be maintained similar to source creek water, and if necessary fish shall be sorted by size to reduce risk of predation.

- Prioritization of species and collection/relocation sites to be prioritized as follows:

  - Endangered species

  - Threatened species

  - Species of special concern

  - Native fishes not under the above categories

  - Non-native fishes if appropriate

- Notify Resource Agencies: Identify a point person to contact at appropriate resource agencies (CDFW, NMFS, and USFWS). At least 24 hours in advance, notify appropriate resource agencies to communicate the details of the fish relocation and to confirm disposition instructions.

- Fish relocation shall be conducted in concurrence with the following conditions:

  - *Setup*: Upon arrival at the site, review the operational sequence and logistics and designate field assignments. Conduct a review of safety and operational methods.

  - *Live well Operation*: If necessary, set up live wells early in the operation to stabilize tank conditions.

- Use local “native” water to fill live wells if available and clean

- To lessen stress on fish, reduce or manage temperature in live wells to be compatible with the water temperatures in which the fish were encountered.

- Start the aeration system prior to placing fish into the live well to ensure that sufficient oxygen is present during the adjustment period. When salmonids are

placed in the live well, managed the live well to the extent possible so that the dissolved oxygen concentration shall be greater than 6 mg/l but less than saturation.

  - *Electrofishing Operation*: Adjust the electrofishing unit settings to the conductivity and temperature of the water. Adjust setting for either varying width (wide to narrow) or varying frequency (high to low) to minimize possible fish injury when these settings elicit proper taxis for fish capture.

- Record the settings used and any incidental electrofishing mortalities in the field notebook. If electrofishing mortalities for salmonids and other species listed as threatened or endangered exceed 5% of the total capture, electrofishing activities shall be reevaluated and possibly terminated.
- Note fish other than salmonids that are mortalities from electrofishing activities shall be used as an indicator of possible injury or mortality rate to salmonids and other fish.
  - *General Collection Guidelines*: Execute collection of fish in a manner to minimize handling time and stress, yet maintain the safety of personnel.
- Use multiple buckets and/or live cars to reduce crowding during collection and transfer.
- Pre-sort fish as needed for transport.
- Equip buckets that hold salmonids with portable aerators until subsequent transfer to a live well.
  - *Transport*: Transport fish to minimize holding time an alternately sequenced in tandem with ongoing collection activities.
- Continue normal live well operations during transport.
  - *Records and Data*: Inventory fish and record other pertinent data, including species, numbers of each species, disposition, and other data such as fork length. If conditions preclude a complete inventory, at a minimum, document species present, their disposition, and an estimate of their abundance.
- Record information on ambient site conditions (available habitat/water quality), including photo documentation at collection and release sites, as appropriate and other information on collection, handling, and transport.
- At completion, conduct an assessment of the fish relocation to identify lessons learned, estimate the number of individual fish and fish species moved and determine the mortality rate. Report shall be forward to the appropriate resource agencies and interested parties.

Significance after Mitigation: Less than Significant. With implementation of Mitigation Measure 3.E-1 (Native Fish Capture and Relocation), which requires the preparation and implementation of a capture and relocation plan with specific components to minimize impacts to steelhead, salmon, and lamprey, should any be present, during electrofishing, capture and relocation the risk of take of special status species would be reduced to a less than significant level with mitigation.

Impact 3.E-2: Construction and operation of the Project would not interfere substantially with the movement or migration of native fish species, including CCC steelhead DPS. (Less than Significant)

Construction Impacts

Central California Coast steelhead DPS, Fall-Run Chinook salmon, and Pacific lamprey are known to migrate through the Project site. All in-water work would occur during the dry season, outside typical migratory windows for these species. Native fish remaining in the Project area during construction would be resident during the season. Alamitos Creek would be blocked with a diversion structure during the draining of the lake and grading of the restored channel during the construction season, but adequate habitat for native fish would be available upstream in Alamitos Creek and downstream of the Project area in Guadalupe Creek. Construction activities would be concluded prior to the rainy season that marks the beginning of migration periods for native fish and the migration pathway would be available. As few native fish would typically migrate through the Project area during the construction period, other habitat is available for these species, and the Project would be fully available during migration season, the impact to the movement and migration of native fish species is less than significant.

Operational Impacts

Native Fish Species

Completion of the Project would facilitate increased movement of native fish species within the Project site and throughout the watershed. The restored Alamitos Creek channel would allow migratory fish species easier access to spawning grounds within the headwaters of the Alamitos Creek watershed and reduce in-stream temperatures downstream of the lake. When the Alamitos Flashboard Dam is in place, up to approximately 1,300 ~~200~~ linear feet of the restored creek channel within the Almaden Lake Project footprint would remain as an impoundment. The Alamitos Flashboard Dam is only in place seasonally (April-December), which is outside of peak adult steelhead up-migration (December-April), and only for portions of the juvenile fish outmigration (December-June) when steelhead are most vulnerable to entrainment. No change in Flashboard operations would occur under the Project.

Additionally, implementation of the Project is likely to reduce the overall number of, and predation pressure from, non-native predatory fish species, which are currently common in Almaden Lake. The conversion of the warm, lacustrine Almaden Lake habitat to a swift, fluvial stream channel reflects a shift away from the preferred habitat condition of exotic fish species towards the historic native environment.

The restored Almaden Lake and Alamitos Creek channel would be subject to future maintenance operations, conducted by the District, most likely in the form of sediment removal and bank stabilization operations. These activities are projected to occur periodically ~~only once every ten years~~, and would be done consistent with the District's SMP and would eventually be covered by the SMP in future renewal of the program. As such, they would comply with the impact avoidance and BMPs described in the *2014-2023 SMP Manual* and

the commensurate NMFS BO (2014). Therefore, operational phase impacts would be less than significant.

Mitigation Measures

None required.

Impact 3.E-3: The Project would not conflict with any local policies or ordinances protecting fisheries resources or with an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. (Less than Significant)

Construction and Operation Impacts

Due to the nature of the Project some amount of in-water work is unavoidable. However, Project design requirements and mitigation measures would be implemented to avoid and minimize impacts to fisheries resources within Almaden Lake and Alamitos Creek. Overall, the Project would be beneficial to native fish species, aquatic and riparian habitat, and flow and water quality conditions in Alamitos Creek. Although fish species are not covered by the SCVHP, the Project would comply with Habitat Plan conditions 3 (Maintain Hydrologic Conditions and Protect Water Quality, 4 (Avoidance and Minimization for In-Stream Projects), and 5 (Avoidance and Minimization Measures for In-Stream Operations and Maintenance), which would ensure impacts to native fish species are minimized. As a result, the Project would be consistent with the criteria of the SCVHP and other local ordinances protecting aquatic resources. After Project completion, ongoing stream maintenance activities would be consistent with the impact avoidance measures and BMPs detailed District's Stream Maintenance Guidelines and further elaborated in the accompanying NMFS BO. As described above, the Project would not conflict with any local policies or plans protecting fisheries resources, resulting in a less than significant impact.

Mitigation Measures

None required.

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3.F Cultural Resources and Tribal Cultural Resources

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to cultural resources and tribal cultural resources, and includes an analysis of impacts to those resources from the Project. For this assessment, cultural resources include architectural resources, archaeological resources, and human remains. Tribal cultural resources include sites, features, places, cultural landscapes, sacred places, or objects that are of cultural value to a Native American tribe. The setting discussion describes the existing Project vicinity and assesses whether there are historical resources for the purposes of CEQA. The impact discussion reviews the criteria for significant impacts on cultural resources and historical resources. The methodology used in the cultural resources analysis included a literature review and field reconnaissance by qualified cultural resource personnel. If needed, ~~District best management practices (BMPs) and~~ mitigation measures to avoid or reduce significant impacts are also identified.

Area of Potential Effect. The term Area of Potential Effect (APE) is used throughout this section to describe the maximum area, surface and subsurface, that could experience ground disturbance as a result of Project activities, including access and staging areas. This includes all locations described in the Project Description (Chapter 2) as well as the entire park boundaries to provide for flexibility in design change, access, and staging areas. The APE consists of the study area, as shown on Figure 2-1. The APE consists of approximately 68 acres. At the north end of the lake near Coleman Road, water from Almaden Lake would be discharged via pipeline to the ~~Los~~ Alamitos/Los Capitancillos Percolation Ponds, and this area is included in the APE. The APE also includes the connecting pipeline to the Almaden Valley Pipeline, which would be constructed within McAbee Road, Winfield Boulevard, and the Lake Almaden Trail ~~or immediately adjacent to the paved Los Alamitos Creek Trail~~. The pipeline would be installed in a trench no greater than 5 feet wide and up to approximately 20 feet deep. The length of the pipeline is 2,900 feet. One staging area is also included in the APE: the District's Winfield Warehouse yard (currently paved and used as parking/staging consisting of 1.5 acres). Additional staging would also take place within the existing footprint of the lake and park, during the construction process.

Depth of ground disturbance would vary with Project components but would not exceed 20 feet below existing ground surface, including the existing lake bottom surface.

3.F.1 Environmental Setting

This section includes information on the prehistoric and historic development within the Project vicinity and identifies existing recorded resources. National, state, and local historic preservation listings and surveys are summarized in this section.

Regional Setting

Archaeological and Historic Setting

Natural Environment

The Project is in the Santa Clara Valley south of the San Francisco Bay. The hills surrounding the Valley are the source of many perennial streams, which run from the hills to the San Francisco Bay. The flood plains of these waterways are prone to flooding in their natural state, with engineered levees providing flood protection.

The Santa Clara Valley exhibits a Mediterranean climate, with year-round moderate temperatures, mild weather, and 14–15 inches of rainfall per year. This type of climate is subject to recurring and sometimes long-lasting droughts.

The San Francisco Bay Area and the surrounding region contain an abundance of natural resources, which would have been taken advantage of by early Native and non-Native populations. The South Bay specifically hosts a wide variety of natural communities, including salt marsh, scrub brush, grassland, and foothill woodlands. Deer, elk, and waterbirds were plentiful, as were marine and Bay resources such as seals, otters, abalone, mussels, oysters, clams and numerous fish species. Franciscan chert was an easily obtainable local raw material for stone tools. Obsidian could be obtained from the Annadel and Napa Glass Mountain quarries to the north (Moratto, 1984).

The region has undergone dramatic landscape changes since humans began to inhabit the region more than 10,000 years ago. Rising sea levels and increased sedimentation into streams and rivers are among some of the changes (Helley et al., 1979). In many places, the interface between older land surfaces and alluvial fans are marked by a well-developed buried soil profile, or a paleosol. Paleosols preserve the composition and character of the earth's surface prior to subsequent sediment deposition; thus, paleosols have the potential to preserve archaeological resources if the area was occupied or settled by humans (Meyer and Rosenthal, 2007). Because human populations have grown since the arrival of the area's first inhabitants, younger paleosols (late Holocene) are more likely to yield archaeological resources than older paleosols (early Holocene or Pleistocene).

Geologic maps indicated that Almaden Lake Park is in an area of Holocene alluvium and stream terrace deposits. As evidenced by other locations in the general vicinity of the City of San José and the South Bay, these geologic formations have a high potential to contain archaeological sites buried by natural alluvial processes (Meyer and Rosenthal, 2007). Previous ground disturbance from excavation of the quarry and construction of Almaden Lake Park and the surrounding facilities significantly lessens the archaeological potential. Additionally, previous survey efforts have not identified archaeological sites in the APE, including efforts completed prior to park construction (Edwards, 1974).

Prehistory

Categorizing the prehistoric period into cultural stages allows researchers to describe a broad range of archaeological resources with similar cultural patterns and components during

a given timeframe, thereby creating a regional chronology. Milliken et al. (2007) provide a framework for the interpretation of the San Francisco Bay Area and have divided human history in the San Francisco Bay Area into four periods: the *Paleoindian Period* (11,500 to 8000 B.C.), the *Early Period* (8000 to 500 B.C.), the *Middle Period* (500 B.C. to A.D. 1050), and the *Late Period* (A.D. 1050 to 1550). Economic patterns, stylistic aspects, and regional phases further subdivide cultural patterns into shorter phases. This scheme uses economic and technological types, socio-politics, trade networks, population density, and variations of artifact types to differentiate between cultural periods.

The *Paleoindian Period* (11,500 to 8000 B.C.) was characterized by big-game hunters occupying broad geographic areas. Evidence of human habitation during *Paleoindian Period* has not yet been discovered in the San Francisco Bay Area. During the *Early Period* (*Lower Archaic*; 8000 to 3500 B.C.), geographic mobility continued from the *Paleoindian Period* and is characterized by the millingslab and handstone as well as large wide-stemmed and leaf-shaped projectile points. The first cut shell beads and the mortar and pestle are documented in burials during the *Early Period* (*Middle Archaic*; 3500 to 500 B.C.), indicating the beginning of a shift to sedentism.

During the *Middle Period*, which includes the *Lower Middle Period* (*Initial Upper Archaic*; 500 B.C. to A.D. 430), and *Upper Middle Period* (*Late Upper Archaic*; A.D. 430 to 1050), geographic mobility may have continued, although groups began to establish longer-term base camps in localities from which a more diverse range of resources could be exploited. The first rich black middens are recorded from this period. The addition of milling tools, obsidian and chert concave-base projectile points, and the occurrence of sites in a wider range of environments suggest that the economic base was more diverse. By the *Upper Middle Period*, mobility was being replaced by the development of numerous small villages. Around A.D. 430 a dramatic cultural disruption occurred evidenced by the sudden collapse of the *Olivella* saucer bead trade network.

During the *Initial Late Period* (*Lower Emergent*; A.D. 1050 to 1550), social complexity developed toward lifeways of large, central villages with resident political leaders and specialized activity sites. Artifacts associated with the period include the bow and arrow, small corner-notched projectile points, and a diversity of beads and ornaments.

Ethnohistory

Based on a compilation of ethnographic, historic, and archaeological data, Milliken (1995) describes a group known as the Ohlone, who once occupied the general vicinity of the Project. While traditional anthropological literature portrayed the Ohlone peoples as having a static culture, today it is better understood that many variations of culture and ideology existed within and between villages. While these “static” descriptions of separations between native cultures of California make it an easier task for ethnographers to describe past behaviors, this masks Native adaptability and self-identity. California’s Native Americans never saw themselves as members of larger “cultural groups,” as described by anthropologists. Instead, they saw themselves as members of specific villages, perhaps related to others by marriage or kinship ties, but viewing the village as the primary identifier of their origins.

Levy (1978) describes the language group spoken by the Ohlone, known as "Costanoan." This term is originally derived from a Spanish word designating the coastal peoples of Central California. Today Costanoan is used as a linguistic term that references to a larger language family spoken by distinct sociopolitical groups that spoke at least eight languages (as different as Spanish is from French) of the same Penutian language group. The Ohlone once occupied a large territory from San Francisco Bay in the north to the Big Sur and Salinas Rivers in the south. The APE is in the greater *Tamyen* tribal area occupied by the *San Juan Bautista* tribelet (Levy, 1978:485). Levy identified the primary settlement at the confluence of the Guadalupe River and Alamitos Creek; CA-SCL-406 may be the archaeological remains of this village (Anastasio et al., 1988 as cited in Basin, 1993).

Economically, Ohlone engaged in hunting and gathering. Their territory encompassed both coastal and open valley environments that contained a wide variety of resources, including grass seeds, acorns, bulbs and tubers, bear, deer, elk, antelope, a variety of bird species, and rabbit and other small mammals. The Ohlone acknowledged private ownership of goods and songs, and village ownership of rights to land and/or natural resources; they appear to have aggressively protected their village territories, requiring monetary payment for access rights in the form of clamshell beads, and even shooting trespassers if caught. After European contact, Ohlone society was severely disrupted by missionization, disease, and displacement. Today, the Ohlone still have a strong presence in the San Francisco Bay Area, and are highly interested in their historic and prehistoric past.

History

The first Europeans to visit the San Francisco Bay area were the Spanish explorers Pedro Fages and Reverend Juan Crespi, who passed through in 1772. A few years later, Juan Bautista de Anza and Father Pedro Font traveled through the region to report on favorable locations for both Mission Santa Clara and the Pueblo of San José de Guadalupe. Mission Santa Clara, founded in 1777, was one of seven missions in Ohlone territory (Hoover et al., 2002).

Almaden Lake is within Pueblo Tract No. 2 (part of the Pueblo Lands of San José) and the Rancho San Juan Bautista Narvaez. Governor Miguel Micheltorena granted the 8,880-acre Rancho San Juan Bautista to Jose Augustin Narvaez in 1844. Narvaez arrived in California in 1787 and was a former *alcalde* of San José.

Prior to the arrival of Euroamericans in the region, the Ohlone had mined for cinnabar in the Almaden area, which they used for pigment. As early as 1824, attempts were made to mine for silver and gold in the deposit. In 1845, a Mexican Army officer identified mercury (or quicksilver) in the cinnabar ore. Mercury, used to extract gold, became a very important commodity only a few years later following the discovery in Sierra Foothills. The New Almaden Mine was the largest mercury mine in North America (SCVWD, 2015).

The discovery of gold in 1848 led to a huge population boom in California, with settlers establishing themselves on Narvaez's land grant. The 1851 California Land Claims Act required Mexican landowners in California to prove the validity of their claim on land held

under Mexican titles. Narvaez's grant was patented in 1865 (Rawls and Bean, 2002). No Spanish or Mexican-era roads, buildings, or other structures or features have been located in the APE (Hendry and Bowman, 1940).

Almaden Road became a major route from San José to the New Almaden mining district. Along the road, the subdivided lands were primarily used for agriculture and livestock. No farmsteads or associated features were located within the APE (Thompson and West, 1876).

Following World War II, the agricultural land use of the area was increasingly replaced by urban and suburban development. Almaden Lake was once a privately-owned gravel quarry. The quarry operation was along the east side of Alamitos Creek and was comprised of two main large pits. Over time, heavy storm events washed away the creek's bank edge that separated the creek from the quarry, making it into one large comingled water body. Almaden Lake Park was developed as a partnership between the City and the District in the late 1970s where both agencies purchased lands encompassing the lake and surrounding park land. The lake and Park were opened for public use in 1982. Activities at the Park originally included fishing, swimming, and pedal boating.

Because Almaden Lake is located downstream from where the historic mining activities occurred, mercury-laden sediment has ended up in the lake. As a result, the water in the lake has deteriorated from the influx of elemental mercury that has settled at its bottom and is converting to methylmercury in anoxic portions of the lake as well as producing high concentrations of methylmercury in the lake fish (SCVWD, 2015). The production of methylmercury results in negative impacts to water quality and health risks in wildlife and humans (SCVWD, 2013).

Project Site

Cultural Resources Records Search and Literature Review

ESA cultural resource staff conducted a records search for the Project at the Northwest Information Center (NWIC) of the California Historical Resources Information System on September 30, 2015 (File No. 15-0510) and updated on October 5, 2018 (File No. 18-0700). The purpose of the records search was to (1) determine whether known cultural resources have been recorded within or within ¼ mile of the APE; (2) assess the likelihood for unrecorded cultural resources to be present based on historical references and the distribution of nearby sites; and (3) develop a context for the identification and evaluation of cultural resources.

Six cultural resources investigations have been completed within and adjacent to the APE. These studies consist of background research and surface surveys including three studies in Almaden Lake Park. Four of these studies included intensive survey efforts within the APE. None of the cultural resource studies that are adjacent to or include part of the Project area have identified any cultural resources within the APE.

The records search results indicate that several prehistoric archaeological sites have been previously identified in the general vicinity of Almaden Lake; none of these sites are in the APE. These sites primarily consist of sparse concentrations of lithic (obsidian) fragments. Two bedrock milling features have also been identified.

Archaeological site CA-SCL-402 is mapped in the vicinity of the APE. The site was originally recorded by archaeologist Miley Holman in 1978 prior to development (Holman, 1978). A surface inspection and a test excavation identified obsidian and chert tools and debitage, fire-affected rock, groundstone tools and fragments, and faunal remains. Site materials extended to approximately 80 cm (30 inches) below the ground surface in a 20-acre area. Bedrock milling outcrops were also identified. The site was described as a large habitation site with extensive research potential for the Santa Clara Valley archaeological record. Recommendations included covering the area with 18 inches of fill prior to construction and monitoring during ground disturbance deeper than the fill layer, including monitoring for a deep sewer trench in 1984 (Holman, 1986). Additional testing in 1986 further defined the site boundaries (Cartier, 1986; Holman, 1986). While not formally evaluated for listing in the California Register of Historical Resources, the site is considered eligible for listing and is a historical resource for the purposes of CEQA.

In addition, a small lithic scatter (CA-SCL-182) is recorded in the vicinity of the APE. The scatter, which is likely a component of CA-SCL-402, is a series of similar locations recorded along a 0.5-mile-long disturbed area. The abundance of recorded sites in the general vicinity is indicative of an extensive area of occupation and use during the prehistoric period.

~~Archaeological site CA-SCL-132 is mapped immediately adjacent to APE. The site was originally recorded by archaeologist James Delgado in 1974 as a rock covered with bedrock mortars (BRMs) under an elderberry tree. The BRM is currently enclosed behind a fence and would not be impacted by the Project. Test excavations by Winter (1977) and Cartier (1980) identified subsurface artifacts in a 700 by 600 square foot area, down to a depth of approximately 90 cm as well as a Native American burial at a depth of approximately 30 cm. Artifacts included flaked stone tools, lithic debitage, baked clay, heat-affected rock, charcoal, faunal bone and shell, as well as historic-period glass, nails, and ceramics.~~

One historic-era architectural resource has been previously identified adjacent to the APE - the Almaden Valley Nursery. The Nursery is west of the APE and consists of an early 20th-century barn recorded in 1987.

Native American Outreach

On October 8, 2015, ESA cultural resources staff contacted the Native American Heritage Commission (NAHC) to request a search of their sacred lands files. A response was received from the NAHC on October 26, 2015 and indicated that the NAHC did not identify sacred lands within or near the APE. The NAHC provided a list of Native American individuals and organizations for Santa Clara County. On November 2, 2015, ESA sent a contact letter to each Native American individual/organization listed on the NAHC contact list

that might have additional information or concerns about the Project. No response has been received as of this writing.

Cultural Resources Field Methods and Findings

On October 15, 2016, ESA conducted a pedestrian survey of the APE, examining all areas of open ground surface. The APE was surveyed in narrow, zigzag 5 to 10-meter-wide transects to examine all areas of exposed ground surface. Surface visibility varied. Landscaping covered much of the area around the lake on the west side. Rodent holes and other minor ground disturbances were closely examined in areas where vegetation obscured visibility. Soil was primarily disturbed artificial fill including light to medium brown silty sand with gravel inclusions. The District's Winfield Warehouse yard staging area is significantly disturbed from the existing use as a construction yard.

On May 3, 2016, ESA conducted a pedestrian survey of the pipeline alignments and pump station to the ~~Los~~ Alamitos Percolation Pond. The alignments are in areas highly disturbed from previous levee or roadway construction.

The surveys did not identify archaeological resources or other evidence of past prehistoric use or occupation in the APE; however much of the APE is paved and/or disturbed. Additionally, the survey did not identify any tribal cultural resources, or historic-era architectural resources that could be considered historical resources for the purposes of CEQA.

~~ESA also completed an additional survey effort on October 8, 2018, focusing on the Los Alamitos Creek Trail pipeline alignment. The trail alignment was paved; the adjacent exposed surface was graded and laid with decomposed granite fill. Adjacent native soil was a light to medium brown loamy silt with gravel inclusions. In the vicinity of the known archaeological site the surface was closely inspected for any evidence of prehistoric use including dark, organic midden soil or lithic debitage; no cultural materials were identified.~~

3.F.2 Regulatory Setting

Federal Regulations

Cultural resources are considered through the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. 306108), and it's implementing regulations. Prior to implementing an "undertaking" (e.g., federal funding or issuing a federal permit), Section 106 of the NHPA requires federal agencies to consider the effects of the undertaking on historic properties (i.e., properties listed in or eligible for listing in the National Register) and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing in the National Register. Under the NHPA, a property is significant if it meets the National Register listing criteria at 36 CFR 60.4, as stated below:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and that:

a) Are associated with events that have made a significant contribution to the broad patterns of our history, or

b) Are associated with the lives of persons significant in our past, or

c) Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or

d) Have yielded, or may be likely to yield, information important in prehistory or history.

Federal review of projects is normally referred to as the Section 106 process. This process is the responsibility of the federal lead agency. The Section 106 review normally involves a four-step procedure, which is described in detail in the implementing regulations (36 CFR Part 800):

- Identify historic properties in consultation with the State Historic Preservation Officers (SHPO) and interested parties;
- Assess the effects of the undertaking on historic properties;
- Consult with the SHPO, other agencies, and interested parties to develop an agreement that addresses the treatment of historic properties and notify the Advisory Council on Historic Preservation; and finally,
- Proceed with the project according to the conditions of the agreement.

State Regulations

The State of California implements the NHPA of 1966, as amended, through its statewide comprehensive cultural resource surveys and preservation programs. The California Office of Historic Preservation, as an office of the California Department of Parks and Recreation (DPR), implements the policies of the NHPA on a statewide level. The Office of Historic Preservation also maintains the California Historical Resources Inventory. The State Historic Preservation Officer is an appointed official who implements historic preservation programs within the state's jurisdictions.

California Environmental Quality Act

CEQA, as codified in Public Resources Code (PRC) Section 21000 et seq., is the principal statute governing the environmental review of projects in the state. CEQA requires lead agencies to determine if a project would have a significant effect on historical resources, including archaeological resources. The CEQA Guidelines define a historical resource as: (1) a resource in the California Register; (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); or (3) any object, building, structure, site, area, place, record, or manuscript that a lead agency

determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

If a lead agency determines that an archaeological site is an historical resource, the provisions of PRC Section 21084.1 and CEQA Guidelines Section 15064.5 would apply. If an archaeological site does not meet the CEQA Guidelines criteria for a historical resource, then the site may meet the threshold of PRC Section 21083 regarding unique archaeological resources. A unique archaeological resource is "an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria.

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person" (PRC Section 21083.2 [g]).

The CEQA Guidelines note that if a resource is neither a unique archaeological resource nor a historical resource, the effects of the project on that resource shall not be considered a significant effect on the environment (CEQA Guidelines Section 15064[c][4]).

California Register of Historical Resources

The California Register is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for eligibility are based on National Register criteria (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for or listed in the National Register.

To be eligible for the California Register, an historical resource must be significant at the local, state, and/or federal level under one or more of the following criteria.

1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2) Is associated with the lives of persons important in our past.
3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
4) Has yielded, or may be likely to yield, information important in prehistory or history (PRC Section 5024.1[c]).

For a resource to be eligible for the California Register, it must also retain enough integrity to be recognizable as a historical resource and to convey its significance. A resource that does not retain sufficient integrity to meet the National Register criteria may still be eligible for listing in the California Register.

California Public Resources Code and Health and Safety Code

Several sections of the PRC protect cultural resources. Under Section 5097.5, no person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site (including fossilized footprints), inscriptions made by human agency, rock art, or any other archaeological, paleontological, or historical feature situated on public lands, except with the express permission of the public agency that has jurisdiction over the lands. Violation of this section is a misdemeanor. Section 5097.98 states that if Native American remains are identified within a project area, the lead agency must work with the appropriate Native Americans as identified by the NAHC and develop a plan for the treatment or disposition of, with appropriate dignity, the human remains and any items associated with Native American burials. These procedures are also addressed in Section 15046.5 of the CEQA Guidelines. California Health and Safety Code Section 7050.5 prohibits disinterring, disturbing, or removing human remains from a location other than a dedicated cemetery. Section 30244 of the PRC requires reasonable mitigation for impacts on paleontological and archaeological resources that occur as a result of development on public lands.

Title 14, Section 4307 of the California Code of Regulations (CCR) also prohibits any person from removing, inuring, defacing, or destroying any object of paleontological, archaeological, or historical interest or value.

Assembly Bill 52

In September of 2014, the California Legislature passed Assembly Bill 52, which added provisions to the PRC regarding the evaluation of impacts on tribal cultural resources under CEQA, and consultation requirements with California Native American tribes. In particular, Assembly Bill 52 now requires lead agencies to analyze project impacts on “tribal cultural resources” separately from archaeological resources (PRC Section 21074; 21083.09). The bill defines “tribal cultural resources” in a new section of the PRC Section 21074. Assembly Bill 52 also requires lead agencies to engage in additional consultation procedures with respect to California Native American tribes (PRC Section 21080.3.1, 21080.3.2, 21082.3).

Specifically, PRC Section 21084.3 states:

a) Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.

b) If the lead agency determines that a project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process provided in Section 21080.3.2, the following are examples of mitigation measures that, if feasible, may be considered to avoid or minimize the significant adverse impacts:

1) Avoidance and preservation of the resources in place, including, but not limited to, planning and construction to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

2) Treating the resource with culturally appropriate dignity taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

   (A) Protecting the cultural character and integrity of the resource.

   (B) Protecting the traditional use of the resource.

   (C) Protecting the confidentiality of the resource.

3) Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

4) Protecting the resource.

Assembly Bill 52 applies to those projects for which a lead agency has issued a Notice of Preparation of an environmental impact report or notice of intent to adopt a negative declaration on or after July 1, 2015. As the NOP for the Project was issued on March 27, 2014, AB 52 does not apply. Regardless, Native American outreach was conducted for the Project and impacts to tribal cultural resources are analyzed below.

Local Regulations

There are no local regulations that pertain to the assessment of Project effects on cultural resources.

3.F.3 Impacts and Mitigation Measures

Significance Criteria

Implementation of the Project would have a significant impact on cultural resources if it were to:

- Cause a substantial adverse change in the significance of a historical resource pursuant to CEQA Guidelines Section15064.5;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section15064.5;
- Disturb any human remains, including those interred outside of formal cemeteries;
- Cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074.

Approach to Analysis

Architectural/Structural Resources

Impacts on architectural resources are assessed by identifying any activities that could affect resources that have been identified as historical resources for the purposes of CEQA. Properties identified as historical resources under CEQA include those that are significant because of their association with important events, people, or architectural styles or master architects, or for their informational value (California Register Criteria 1, 2, 3, and 4) and that retain sufficient historical integrity to convey their significance. Criterion 4 is typically applied to the evaluation of historic-period archaeological resources and not to architectural resources, as described below.

Once a resource has been identified as a CEQA historical resource (either architectural or archaeological), it then must be determined whether the impacts of the Project would "cause a substantial adverse change in the significance" of the resource (CEQA Guidelines Section15064.5[b]). A substantial adverse change in the significance of a historical resource means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historic resource would be materially impaired" (CEQA Guidelines Section15064[b][1]). A historical resource is materially impaired through the demolition or alteration of the resource's physical characteristics that convey its historical significance and that justify its inclusion in the CRHR (CEQA Guidelines Section15064.5[b][2][A]).

Archaeological Resources

The significance of most prehistoric and historic-period archaeological sites is usually assessed under California Register Criterion 4. This criterion stresses the importance of the information potentially contained within the site, rather than its significance as a surviving example of a type or its association with an important person or event. Archaeological resources may also be assessed under CEQA as unique archaeological resources, defined as archaeological artifacts, objects, or sites that contain information needed to answer important scientific research questions.

Human Remains

Human remains, including those buried outside of formal cemeteries, are protected under several state laws, including PRC Section 5097.98 and Health and Safety Code Section 7050.5. These laws are identified above in Section 3.F.2, Regulatory Setting. This analysis considers impacts including intentional disturbance, mutilation, or removal of interred human remains.

Tribal Cultural Resources

A tribal cultural resource is defined as a site feature, place, cultural landscape, sacred place or object, which is of cultural value to a tribe that is either on or eligible for the California Register or a local historic register, or the lead agency, at its discretion, chooses to treat the

resource as a tribal cultural resource. This analysis considers whether the Project would cause damaging effects to a tribal cultural resource.

Avoidance and Minimization Measures Incorporated into the Project

Avoidance and minimization measures are those parameters that have been built into the design of the Project and are committed to as part of Project implementation. These measures are generally included in the Project Description (Chapter 2) of this report; no additional avoidance or minimization measures relevant to Cultural Resources have been incorporated into the Project.

No Impact Significance Determinations

There would be no impact related to the following criterion:

> *Cause a substantial adverse change in the significance of a historical resource pursuant to CEQA Guidelines Section15064.5.* The Project could result in a significant impact if it caused a substantial adverse change to a historical resource (architectural resources or the built environment, including buildings, structures, and objects). Historical resources that are also considered archaeological resources are considered below under Impact 3.F-1. Based on the results of the background research and survey effort, there are no historical architectural resources in the APE. As there are no historical resources of the built environment within the APE, the Project would have no impacts on historical resources.

Impact Summary

Table 3.F-1 provides a summary of cultural resources impacts by implementation phase (construction and operations).

TABLE 3.F-1
SUMMARY OF CULTURAL AND TRIBAL CULTURAL RESOURCES IMPACTS

Impact Statement	Construction	Operation
Impact 3.F-1: The Project would cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5, human remains, including those interred outside of formal cemeteries, or a tribal cultural resource as defined in PRC Section 21074.	LSM	NI

NI = No impact
LSM = Less than significant with mitigation

Impacts and Mitigation Measures

Construction Impacts

Impact 3.F-1: The Project would cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5, human remains, including those interred outside of formal cemeteries, or a tribal cultural resource as defined in PRC Section 21074. (Less than Significant with Mitigation)

Based on the records search, survey, and previous disturbance, there are ~~no~~ known archaeological resources~~, human remains, or~~ and potential tribal cultural resources in the vicinity of the APE. Site CA-SCL-402 is a large area of prehistoric cultural materials that is considered eligible for listing in the California Register; the site is a historical resource for the purposes of CEQA. The main concentration of site materials is located to the north of the APE. In addition, a small lithic scatter (CA-SCL-182) is adjacent to the APE.

Numerous utilities currently extend through the APE, including a 2-inch gas line, a 2-inch telephone line, a 6-inch sanitary sewer line, an 8-inch water line, and a 12-inch storm drain. In addition, extensive development has occurred to the north and south of the APE beginning in the late 1970s. These intrusions have likely highly disturbed the APE and potential archaeological site materials.

Given the proximity of the connection pipeline to ~~a~~ known prehistoric site~~s with human remains~~ (CA-SCL-~~132~~402 and CA-SCL-182), there is a heightened potential to uncover cultural materials or human remains during Project implementation. Impacts to CA-SCL-~~132~~402 and CA-SCL-182 during Project implementation would be a significant impact.

Mitigation Measure 3.F-1a (Preconstruction Training and Cultural Resources Monitoring) is recommended to ensure immediate compliance with cultural resources discoveries and regulatory requirements for construction activities within 200 feet of the ~~connection pipeline southern terminus~~ boundaries of CA-SCL-402 and CA-SCL-182. Implementation of Mitigation Measure 3.F-1a would reduce impacts to ~~CA-SCL-132~~CA-SCL-402 and CA-SCL-182 to a less than significant level.

Despite the low potential throughout the rest of the Project area, the inadvertent discovery of archaeological resources (including those determined to be tribal cultural resources) or human remains cannot be entirely discounted. The inadvertent discovery of resources would be a significant impact. In the event of an unanticipated discovery, the District shall implement Mitigation Measure 3.F-1b (Accidental Discovery of Archaeological Artifacts, Tribal Cultural Resources or Burial Remains) to reduce impacts to previously undiscovered archaeological resources, tribal cultural resources, and human remains. Mitigation Measure 3.F-1b would reduce impacts related to archaeological resources, tribal cultural resources, and human remains to a less than significant level by requiring personnel to stop work and report finds. Implementation of this measure would ensure that avoidance or preservation in place is first considered, and if not feasible resources are documented, evaluated, and if required, treated appropriately in accordance with PRC Section 21083.2

and CEQA Guidelines Section 15126.4. In addition, if human remains are identified no further excavation or disturbance occur until authorized. This mitigation measure would reduce this impact to a less than significant level. No further mitigation would be required.

Operation Impacts

Most maintenance activities would not result in ground disturbance. Occasional bank stabilization and sediment removal may be required in the restored channel; however, the channel would be restored with imported material brought in to raise the level of existing lake bottom to the match Alamitos Creek upstream. As the restored channel would be imported material, there would be no possibility of encountering cultural resources during maintenance, and there would be no impact to cultural resources.

Mitigation Measures

Mitigation Measure 3.F-1a: *Preconstruction Training and Cultural Resources Monitoring*. Prior to construction, a qualified archaeologist shall prepare a cultural resources monitoring plan. The District shall review and approve the plan. The plan shall include a requirement for monitoring of construction activities within 200 feet of archaeological site<u>s</u> CA-SCL-~~132~~<u>402 and CA-SCL-182</u> by a qualified archaeologist and, if reasonably available, a Native American representative. The plan shall include (but not be limited to) the following components:

- A training program for all construction and field workers involved in site disturbance that would be completed prior to the commencement of construction activities and that would train site workers in the identification of cultural resources, and actions to be undertaken in the event that cultural resources are discovered;
- The identification of person(s) responsible for conducting monitoring activities, including Native American monitors;
- The identification of person(s) responsible for overseeing and directing the monitors;
- Monitoring protocols and procedures, including the ability of the monitor to stop work within 100 feet of the find, and the required format and content of monitoring reports;
- The schedule for submittal of monitoring reports and identification of person(s) responsible for review and approval of monitoring reports;
- A protocol for notifications in the event cultural resources are encountered, as well as methods of ~~dealing with the~~ <u>avoiding or minimizing impacts to the</u> encountered resources (e.g., collection, identification, curation) <u>consistent with CEQA Guidelines Section 15126.4(b)(3)</u>;
- Methods to ensure the security of cultural resources sites; and
- A protocol for notifying local authorities (i.e. Sheriff, Police) should site looting and other illegal activities occur during construction.

During the course of the construction monitoring, the archaeologist may adjust the frequency, from continuous to intermittent, of the monitoring based on the conditions and professional judgment regarding the potential to impact resources.

Mitigation Measure 3.F-1b: *Accidental Discovery of Archaeological Artifacts, Tribal Cultural Resources, or Burial Remains*. If historical or unique archaeological artifacts (including potential tribal cultural resources) are accidentally discovered during construction, the District shall restrict work in affected areas until proper protocols are met. Work at the location of the find will halt immediately within 30 feet of the find. A "no work" zone shall be established utilizing appropriate flagging to delineate the boundary of this zone. A Consulting Archaeologist will visit the discovery site as soon as practicable for identification and evaluation pursuant to Section 21083.2 of the Public Resources Code and Section 15126.4 of the California Code of Regulations. If the archaeologist determines that the artifact is not significant, construction may resume. If the archaeologist determines that the artifact is significant, the archaeologist will determine if the artifact can be avoided and, if so, will detail avoidance procedures. If the artifact cannot be avoided, the archaeologist will develop within 48 hours an Action Plan which will include provisions to minimize impacts and, if required, a Data Recovery Plan for recovery of artifacts in accordance with Public Resources Code Section 21083.2 and Section 15126.4 of the CEQA Guidelines. Impacts to tribal cultural resources shall be assessed in consultation with culturally-affiliated Native American tribes.

If burial finds are accidentally discovered during construction, work in affected areas will be restricted or stopped until proper protocols are met. Upon discovering any burial site as evidenced by human skeletal remains, the County Coroner will be immediately notified and the field crew supervisor shall take immediate steps to secure and protect such remains from vandalism during periods when work crews are absent. No further excavation or disturbance within 30 feet of the site or any nearby area reasonably suspected to overlie adjacent remains may be made except as authorized by the County Coroner, California Native American Heritage Commission, and/or the County Coordinator of Indian Affairs.

Impact Significance after Mitigation: Less than Significant. Mitigation Measures 3.F-1a and 3.F-1b would require the preparation of a cultural resources monitoring plan to be implemented for all work within 200 feet of site CA-SCL-~~132~~402 and CA-SCL-182 to minimize impacts to ~~this~~ these resources and establish protocols and buffers should other unknown sites be discovered.

3.F.4 References

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3.G Energy

This section identifies and evaluates issues related to energy in the context of the Project. Discussed are the regional and local setting and the impacts associated with construction, operation, and maintenance of the Project.

3.G.1 Environmental Setting

Regional and Local Setting

California's energy system includes electricity, natural gas, and petroleum. According to the California Energy Commission (CEC), California's energy system generates 71 percent of the electricity, 10 percent of the natural gas, and 31 percent of the petroleum consumed or used in the state. The rest of the state's energy and energy sources are imported, and includes electricity from the Pacific Northwest and the Southwest; natural gas purchases from Canada, the Rocky Mountain States, and the southwest; and petroleum imported from Alaska and foreign sources (CEC, 2019a; 2019b; and 2019c). Construction and operation of the Project would require the use of electricity and transportation fuels, primarily in the form of gasoline and diesel. Therefore, those energy resources are discussed below in the context of the regional and local setting for the Project.

Electricity

The production of electricity requires the consumption or conversion of energy resources including natural gas, coal, water, nuclear, and renewable sources such as wind, solar, and geothermal. Of the electricity generated in California in 2017, 43.4 percent is generated by natural gas-fired power plants, 0.2 percent is generated by coal-fired power plants, 17.9 percent comes from large hydroelectric dams, and 8.7 percent comes from nuclear power plants. The remaining 29.7 percent in-state total electricity production is supplied by renewable sources including solar, biomass, geothermal, small hydro, and wind power (CEC, 2019a). Electricity is distributed via a network of high voltage transmission lines commonly referred to as the power grid.

Electricity consumption in Santa Clara County for 2017 was 17,190 gigawatt-hours (GWh) (CEC, 2019d). Pacific Gas and Electric Company (PG&E) is the local public utility and energy supplier in the Project area, and produces and purchases electricity from both renewable and nonrenewable resources. PG&E provides electric service to approximately 16 million people throughout a 70,000-square-mile service area in northern and central California that stretches from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada in the east (PG&E, 2019).

The District is a member of Power and Water Resources Pooling Authority (PWRPA), a joint powers authority (JPA) to collectively manage electrical loads and generation assets. PWRPA is subject to the State of California "Renewable Portfolio Standard" (RPS) mandate, whereby electric utilities must serve a RPS percentage of retail sales with renewable resources within a given Compliance Period. In addition to supporting the District's governance policy to achieve

carbon neutrality, local renewable energy projects being pursued by the District will also contribute to PWRPA's requirement to meet the RPS mandate.

Gasoline

Gasoline is by far the largest transportation fuel by volume used in California. Nearly all of the gasoline used in California is obtained through the retail market. In 2017, approximately 15.6 billion gallons of gasoline were sold in California's retail market, and the total sales of gasoline in Santa Clara County in 2017 was 685 million gallons (CEC, 2018).

Diesel

Diesel fuel is the second largest transportation fuel by volume used in California behind gasoline. According to the U.S. Department of Energy's Energy Information Administration, nearly all semi-trucks, delivery vehicles, buses, trains, ships, boats and barges, farm, construction, and military vehicles and equipment have diesel engines. It is estimated that approximately 51 percent of total diesel sales in California are associated with retail sales. In 2017, 3.8 billion gallons of diesel were sold in California (CEC, 2019). In 2017, retail sales of diesel fuel in Santa Clara County were 36 million gallons (CEC, 2018).

3.G.2 Regulatory Setting

Federal Regulations

National Energy Conservation Policy Act

The National Energy Conservation Policy Act (NECPA) serves as the underlying authority for federal energy management goals and requirements. Signed into law in 1978, it has been regularly updated and amended by subsequent laws and regulations. This act is the foundation of most federal energy requirements. NECPA established energy-efficiency standards for consumer projects and includes a residential program for low-income weatherization assistance, grants, and loan guarantees for energy conservation in schools and hospitals, and energy-efficiency standards for new construction. Furthermore, the NEPCA established fuel economy standards for on-road motor vehicles in the United States. The National Highway Traffic and Safety Administration (NHTSA), which is part of the U.S. Department of Transportation (USDOT), is responsible for establishing additional vehicle standards and revising existing standards under the NEPCA. The USDOT is authorized to assess penalties for noncompliance. In the course of more than 30 years, this regulatory program has resulted in improved fuel economy throughout the United States' vehicle fleet (NHTSA, 2014; 2018).

National Energy Policy Act of 2005

The National Energy Policy Act of 2005 sets equipment energy efficiency standards and seeks to reduce reliance on non-renewable energy resources and provide incentives to reduce current demand on these resources. For example, under the Act, consumers and

businesses can attain federal tax credits for purchasing fuel-efficient appliances and products, including hybrid vehicles; constructing energy-efficient buildings; and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment.

Executive Order 13423 (Strengthening Federal Environmental, Energy, and Transportation Management), signed in 2007, strengthens the key energy management goals for the federal government and sets more challenging goals than the Energy Policy Act of 2005. The energy reduction and environmental performance requirements of Executive Order 13423 were expanded upon in Executive Order 13514 (Federal Leadership in Environmental, Energy, and Economic Performance), signed in 2009.

Energy and Independence Security Act of 2007 and Corporate Average Fuel Economy Standards

The Energy and Independence Security Act of 2007 (42 USC §17001) sets federal energy management requirements in several areas, including energy reduction goals for federal buildings, facility management and benchmarking, performance and standards for new buildings and major renovations, high-performance buildings, energy savings performance contracts, metering, energy-efficient product procurement, and reduction in petroleum use, including by setting automobile efficiency standards, and increase in alternative fuel use. This act also amends portions of the National Energy Policy Conservation Act, described above.

State Regulations

California Energy Commission

The CEC was established by the Warren-Alquist Act in 1974 and is the State's primary energy policy and planning agency. The CEC has five major responsibilities: forecasting future energy needs and keeping historical energy data; licensing thermal power plants 50 megawatts or larger; promoting energy efficiency through appliance and building standards; developing energy technologies and supporting renewable energy; and planning for and directing state response to energy emergencies.

Administered by the CEC, the California Energy Action Plan (EAP) was adopted in 2003 and a second EAP was adopted by both the CEC and the California Public Utilities Commission (CPUC) in 2005. The EAP established shared goals and specific actions to ensure that adequate, reliable, and reasonably priced electrical power and natural gas supplies are achieved and provided through policies, strategies, and actions that are cost-effective and environmentally sound for California's consumers and taxpayers. Also, incorporated in the EAP are specific actions reflecting the importance of transportation fuels to California's economy and the need to mitigate the environmental impacts caused by their use, as well as the importance of taking actions in the near term to mitigate California's contributions to climate change from the electricity, natural gas, and transportation sectors. In 2008, the EAP was updated to expand on the State's actions in the context of global climate change and include the passage of Assembly Bill 32, the California Global Warming Solutions Act of 2006.

California Air Resources Board

Governor Ronald Reagan approved the Mulford-Carrell Air Resources Act to create the State Air Resources Board, committing California to a unified, statewide approach to address air pollution in the state. CARB was a merger of the Bureau of Air Sanitation and the California Motor Vehicle Pollution Control Board. That same year, the Federal Air Quality Act of 1967 was enacted, giving California the ability to set its own more stringent air quality rules due to California's unique geography, weather, and expanding number of people and vehicles.

California Advanced Clean Cars Program/Zero Emission Vehicle Program

In January 2012, CARB approved an emissions-control program for vehicle model years 2017 through 2025. The program combines the control of smog, soot, and greenhouse gas with requirements for greater numbers of zero-emission vehicles into a single package of standards called Advanced Clean Cars. The components of the Advanced Clean Cars Program include the Low-Emission Vehicle (LEV) regulations that reduce criteria pollutants and greenhouse gas emissions from light- and medium-duty vehicles, and the Zero-Emission Vehicle (ZEV) regulation, which requires manufacturers to produce an increasing number of pure ZEVs (meaning battery electric and fuel cell electric vehicles), with provisions to also produce plug-in hybrid electric vehicles (PHEV) in the 2018 through 2025 model years. In March 2017, CARB voted unanimously to continue with the vehicle greenhouse gas emission standards and the ZEV program for cars and light trucks sold in California past 2025 (CARB, 2017).

CARB Heavy Duty Regulations

CARB's Truck and Bus Regulation also requires diesel trucks that operate in California to be upgraded to reduce emissions. Newer heavier trucks must meet PM filter requirements beginning in 2012. Lighter and older heavier trucks must be replaced starting in 2015. By 2023 nearly all trucks would have 2010 model year engines or equivalent (CARB, 2019).

In 2004, CARB adopted a fourth tier of increasingly stringent advanced after treatment for new off-road compression-ignition engines, including those found in construction equipment. These "Tier 4" standards were phased-in across product lines from 2008 through 2015 and reduced exhaust emission levels by up to 95 percent compared to previous control strategies. In 2007, CARB first approved the Off-Road Regulation that requires off-road fleets to reduce their emissions by retiring, replacing, or repowering older engines (CARB, 2016).

California Public Utilities Commission

The CPUC was established in 1911 as the Railroad Commission and was expanded in 1912 to regulate privately owned electric, natural gas, telecommunications, water, railroad, and marine transportation companies, including PG&E. The CPUC ensures that consumers receive safe and reliable utility services at reasonable rates, protects against fraud, and promotes the health of California's economy.

California Independent System Operator

The California Independent System Operator was established in 1998 and is a non-profit organization that independently manages the flow of electricity in California. It provides open access to the grid, ensuring equal access and a competitive energy market. In addition, it facilitates over 28,000 market transactions each day to ensure that enough power is available to meet demands.

CALGreen Building Code

The 2016 California Green Building Standards Code, as specified in Title 24, Part 11 of the California Code of Regulations, specifies building standards to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices. The provisions of this code apply to the planning, design, operation, construction, replacement, use and occupancy, location, maintenance, removal, and demolition of every building or structure or any appurtenances connected or attached to such building structures throughout California. Since the Project would include not include construction of building(s), the 2016 California Green Building Standards Code would not be applicable to the Project.

Renewable Portfolio Standard

Senate Bill 1078 (SB 1078) (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, the Governor signed Executive Order S-14-08, which expanded the State's Renewable (Energy) Portfolio Standard (RPS) to 33 percent renewable power by 2020. On September 15, 2009, the Governor issued Executive Order S-21-09 requiring the California Air Resources Board (CARB), under its AB 32 authority, to adopt regulations to meet a 33 percent RPS target by 2020. The CARB regulations use a phased-in or tiered requirement to increase the amount of electricity from eligible renewable sources over an 8-year period that began in 2012. CARB adopted the regulations in September 2010.

In March 2011, the Legislature passed SB X1-2, which was signed into law by the Governor the following Month. SB X1-2 requires utilities to procure renewable energy products equal to 33 percent of retail sales by December 31, 2020, and also established interim targets: 20 percent by December 31, 2013, and 25 percent by December 31, 2016. Senate Bill 350 (SB 350) of 2015 (Chapter 547, Statutes of 2015) increased the RPS to 50 percent by the year 2030. In 2018, SB 100 was signed into law, which again increased the RPS to 60 percent by 2030 and requires all state's electricity to come from carbon-free resources by 2045. SB 100 took effect on January 1, 2019.

Local Regulations

Envision San José 2040 General Plan

The following goal and policies of City of San José's *Envision San José 2040 General Plan* (General Plan) may be applicable to the Project (City of San José, 2018).

Goal MS-2 – Energy Conservation and Renewable Energy Use

Policy MS-2.3. Utilize solar orientation (i.e., building placement), landscaping, design, and construction techniques for new construction to minimize energy consumption.

Policy MS-2.4. Promote energy efficient construction industry practices.

Municipal Code

The City's Municipal Code includes regulations for energy efficiency and energy use. City regulations include a Green Building Ordinance (Chapter 17.84) to foster practices to minimize the use and waste of energy, water, and other resources in the City, Water Efficient Landscape Standards for New and Rehabilitated Landscaping (Chapter 15.10), and a Construction and Demolition Diversion Deposit Program that fosters recycling of construction and demolition materials (Chapter 9.10).

3.G.3 Impacts and Mitigation Measures

Significance Criteria

Implementation of the Project would have a significant impact on energy if it were to:

- Result in wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation;
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Approach to Analysis

The following analysis discusses the impacts of the Project related to energy resource impacts in the Project area. This section includes an analysis of short-term (construction) and long-term (operation) impacts of the Project. Impact evaluations are assessed based on the existing conditions described earlier in this section. Mitigation measures are identified, as necessary, to reduce significant impacts. The analysis considers the Project, Appendix G of the State CEQA Guidelines, current conditions, and applicable regulations, plans, and policies.

This analysis is based, in part, on basic assumptions regarding construction-related diesel and gasoline consumption for the Project, and estimates of the operational energy requirements for the Project. The analysis focuses on the anticipated energy demand and energy efficiency of the Project as a whole, including during construction, operation, and maintenance of the proposed facilities.

Average off-road equipment inventories for calendar year 2021 and construction and operation activity assumptions identified in the air quality and GHG emission calculations (see Appendix B) were used by the District's consultant (Environmental Science Associates [ESA]) to estimate fuel amounts that would be consumed by off-road equipment during construction of the Project. Fuel consumption factors for off-road equipment were derived from equipment inventory data using the California Air Resources Board's off-road emissions inventory database. Fuel use that would be associated with commuting workers and truck hauling during construction and operation of the Project were also estimated using trip data projected for the Project and relevant vehicle fuel economy information (see Appendix B for all fuel consumption factors and assumptions).

No Impact Significance Determinations

Based on the nature of the Project, there would be no impact related to the following criterion:

> *Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.* The Project would not include the development or demolition of any buildings. Therefore, no impact related to compliance with applicable energy and energy efficiency/ conservation standards or codes, such as the California Building Standards or California Energy Code, would result. In addition, given the nature of the Project, it would have no impact related to conflicting with or obstructing California's Renewable Portfolio Standard.

Impact Summary

Table 3.G-1 provides a summary of the energy impact by implementation phase (construction and operations).

TABLE 3.G-1
SUMMARY OF THE ENERGY RESOURCES IMPACT

Impact Statement	Construction	Operation
Impact 3.G-1: The Project would result in wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation.	LSM	LS

LS = Less than significant
LSM = Less than significant with mitigation

Impacts and Mitigation Measures

Impact 3.G-1: The Project would result in wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation. (Less than Significant with Mitigation)

Construction

Construction-related energy expenditures that would be associated with the Project would include both direct and indirect uses of energy, primarily in the form of diesel and gasoline fuel. Direct energy use would include the consumption of petroleum for operation of construction vehicles and equipment. Indirect energy use includes the energy required to make the materials and components used during construction. This includes energy used for

extraction of raw materials, manufacturing, and transportation associated with manufacturing.

Although the precise amount of construction-related direct energy consumption that would occur under the Project is unknown, it is estimated that there would be a total of approximately 60,012 off-road equipment-operation hours that would consume a total of approximately 206,629 gallons of diesel fuel at an average rate of 3.3 gallons per hour. With regard to vehicle use during construction, commuting workers' vehicles would travel an average of approximately 12.4 miles per trip for a project total of over 307,917 miles and would consume a total of approximately 13,996 gallons of gasoline (assuming an average fuel economy of 22 miles per gallon) and heavy haul and vendor trucks would travel an average of approximately 18.5 miles and 7.3 miles per trip, respectively, for a project total of approximately 1,562,648 miles and would consume a total of approximately 260,441 gallons of diesel fuel (assuming an average fuel economy rate of 6.0 miles per gallon) (see Appendix B for all assumptions and fuel use factors). When averaged over the construction period, the annual fuel use for off-road construction equipment would be approximately 103,315 gallons of diesel fuel per year, construction workers' personal vehicles would consume approximately 6,998 gallons of gasoline per year, and heavy haul trucks would consume approximately 130,221 gallons of diesel fuel per year. The total average annual fuel use during the construction period would be approximately 6,998 gallons per year of gasoline and approximately 233,535 gallons per year of diesel fuel. These annual average use amounts are equivalent to less than 0.01 percent of the total gasoline fuel sold in Santa Clara County, and approximately 0.33 percent diesel fuel sold in Santa Clara County (see the *Regional and Local Setting* discussion above).[1]

It should be noted that the gasoline and diesel vehicle fuel use estimates provided above assume that all Project-related vehicles would consume gasoline or diesel fuel. However, pursuant to the state's Advanced Clean Cars Program that includes regulations to increase production of battery electric and fuel cell electric vehicles through the 2018 through 2025 model years, the actual vehicle fuel use that would be associated with the construction of the Project may be less than described above, while there may also be a modest increase in indirect electricity use.

In addition to the equipment and vehicle fuel use described above, this analysis conservatively assumes that the District may ship up to 50,000 tons of contaminated lake bed sediment via railroad from Port of Oakland to an approved disposal site in Utah (although the District anticipates the actual need may be approximately half that amount). The associated amount of locomotive diesel fuel that would be consumed during the roundtrip to and from Utah has been estimated to be approximately 65,000 gallons,

[1] The projected construction start has been revised to 2022; however, the energy use calculations are based on a June 2021 construction start, which is a more conservative assumption because the CalEEMod emissions model uses energy use factors for vehicle inventories that lower emissions each calendar year due to the introduction of new lower-emitting vehicles each year and the retirement of older higher-emitting equipment and vehicles each year. For this reason, the Draft EIR energy use estimates have not been revised to reflect the new Project information (i.e., start date and revisions to Table 2-3), but continue to represent a conservative estimate for the Project.

approximately 4,000 gallons of which would be consumed within the Bay Area (see Air Quality and GHG Emissions in Appendix B).

While the overall fuel use requirements would not be significant relative to the overall sales of fuels in the County, construction activities could result in wasteful or inefficient use of energy fuels. The potential for construction activities to use large amounts of fuel or energy in a wasteful or inefficient manner would be a significant impact. However, with implementation of Mitigation Measure 3.C-1b (BAAQMD Basic Construction Mitigation Measures), which would require construction equipment to be well maintained and properly tuned, and would limit equipment and vehicle idling, construction activities would be conducted in a fuel-efficient manner, and the construction impact would be reduced to a less than significant level.

Operations

Future maintenance of the Project could include sediment removal and bank protection activities. Sediment removal is only anticipated to be needed periodically downstream of the Lake as currently occurs under the Stream Maintenance Program ~~once every ten years~~ and would only last a few weeks in duration, while bank repair and levee settlement adjustment would only occur if necessary. The only other applicable operational activities that would require use of energy fuels over baseline conditions would be limited to occasional worker vehicle trips to the site to maintain the landscaping during the first three years of the Project's operation and inspection and maintenance of the new levee a few times a year. These infrequent vehicle trips and landscaping equipment operation would be intermittent and would require limited transportation fuels. In addition to fuel use, the pump station at the new levee would have three operating pumps and two backup pumps, each approximately 40 horsepower, ~~two 135 horsepower (30 kilowatts) pumps~~ that may be powered with electricity obtained from PG&E's electrical power grid, should a strictly renewable power source, such as through the PWRPA, not be available. However, pursuant to the state's Renewable Portfolio Standards, PG&E's power grid will continue to increase its reliance on renewable power sources and will be required to provide electricity that will be generated with at least 33 percent renewable power by 2020 and 60 percent renewable power by 2030. The District has designed the pump station, both in terms of the horsepower of the pumps and the locations for the pump station options, to ensure it would be operated in an efficient manner that would not result in the wasteful use of electricity. Assuming ~~these~~ the three pumps would operate continuously at full power (a conservative assumption), they would consume approximately ~~1,587,360~~ 705,500 kilowatt-hours (kWh) per year. This amount of electrical power is negligible when compared to the amount of electricity consumed in Santa Clara on an annual basis (i.e., 17,190 GWh in 2017). In addition, solar powered circulators would be installed to manage and reduce future methylmercury production. The pumps and circulators would be operated in an energy efficient manner, and the operational impact would be less than significant.

Mitigation Measures

Implement Mitigation Measure 3.C-1b (see Section 3.C, Air Quality, Impact 3.C-2).

Impact Significance after Mitigation: Less than Significant.

3.G.4 References

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3.H Geology and Soils

This section describes the environmental and regulatory setting of the Project area, including all areas of potential disturbance, with respect to geology, soils, seismicity, and paleontological resources in the vicinity of the Project site, including geologic and seismic hazards. The analysis considers impacts resulting from the construction, operation, and maintenance of the Project. Impacts relating to sediment and erosion are considered in Section 3.K, Hydrology and Water Quality.

3.H.1 Environmental Setting

The discussion of regional and Project site geology, soils, seismicity, and paleontological resources is based on the geotechnical and geological investigation report undertaken by Cal Engineering & Geology (CE&G) (2015) (Appendix D), unless otherwise cited.

Topography

The Project site lies within the Coast Ranges of California, which are northwest-southeast trending mountain ranges and intervening valleys. The site is located on the northeastern margin of the Almaden Valley, a valley immediately downstream and northwest of Calero Reservoir. Alamitos Creek flows northwest through the site. The site is located at an elevation of about 195 feet above sea level.

Geology

Regionally, Almaden Lake is located on the eastern margin of a relatively flat alluvial valley. The Project site is underlain by Quaternary age surficial sediments consisting of sand and gravel of major stream channels and bounded by Quaternary age alluvium consisting of gravel sand and clay of valleys.

Land

The land-based areas of the Project site are relatively uniform, with approximately 9 to 19 feet of artificial fill, consisting of variable thicknesses of silt combined with varying amounts of sand, gravel, clay, asphalt, and concrete debris. The density of granular artificial fill varies from medium dense to very dense; fine grained artificial fill varies in consistency from stiff to hard. Alluvial deposits underlain the artificial fill, consisting primarily of granular soils comprised of various grades of gravel, sand, silty sand, sandy clay, and lean clay. Granular alluvial deposits vary in density from medium dense to very dense. Fine grained alluvial deposits vary in consistency from stiff to very stiff.

The groundwater level in the Project area is between 9 and 18.5 feet below ground surface, but fluctuates seasonally according to rainfall, water recharge programs, well pumping, or other factors.

Over-Water

The over-water areas of the Project site are relatively uniform. The lake bottom is underlain by between 4 and 11 feet of lake sediments, consisting of variable thickness of silts with low plasticity with variable amounts of fine sand, peat, and fat clay, all with very soft or loose consistency. The silts behave like loose, cohesionless material. Lake sediments are underlain by alluvial deposits consisting of a mixture of well-graded gravel, sand, silt, and elastic silt. The density of granular alluvial deposits varies from medium dense to very dense; fine grained alluvial deposits density varies from stiff to very stiff. The boundary between the very soft lake sediments and the underlying alluvial deposits is characterized by a distinct increase in relative density.

Seismicity and Geologic Hazards

Seismicity

The Project area can be expected to experience periodic minor earthquakes and possibly a major earthquake on one of the nearby active faults during the lifespan of the components. The Project site is located within the greater San Francisco Bay Area which is recognized as one of the more seismically active regions of California. The San Andreas fault system marks the major boundary between two of earth's tectonic plates, the Pacific Plate on the west and the North American Plate on the east. The right-lateral strike-slip[1] San Andreas fault system controls the northwest-southeast structural grain of the Coast Ranges and the Bay Area. The other major faults in the region are the Sargent, Hayward, Greenville, San Gregorio and Calaveras faults. These faults, their distances from the Project site, and their moment magnitude[2] (Mw) are presented in Table 3.H-1.

Fault Rupture

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. Ground rupture is considered more likely along active faults, which are discussed above. The Project site is not located within or immediately adjacent to an Earthquake Fault Zone for active faults as designated by the State Geologist. The nearest fault to the Project site, the Monte Vista-Shannon fault system, has been mapped approximately 1.7 miles from the site, but this fault is inactive.

1 Refers to relative motion on either side of a fault that is primarily horizontal (as opposed to vertical). If straddling the fault, the right side of a right-lateral fault would move towards the observer.

2 Moment Magnitude (Mw) is related to the physical size of a fault rupture and movement across a fault. Moment magnitude provides a physically meaningful measure of the size of a faulting event (CGS, 2002b). The Maximum Moment Magnitude Earthquake is derived from the joint CGS/USGS Probabilistic Seismic Hazard Assessment for the State of California, 1996 (Peterson et al., 1996).

TABLE 3.H-1
DISTANCES TO MAJOR ACTIVE FAULTS

Active Fault[a] Segment	Approx. Distance from Fault (Miles)	Direction from Site	Moment Magnitude of Maximum Earthquake
Sargent	8.3	southwest	6.7
San Andreas	8.2	southwest	7.9
Hayward Southern extension	7.5	east-northeast	7.1
Calaveras south	10.6	northeast	6.8
Hayward south	14.3	north	7.1
Greenville	23.6	northeast	6.9
San Gregorio	24.9	southwest	7.3

NOTES:

[a] An "active" fault is defined by the State of California as a fault that has had surface displacement within approximately the last 11,000 years. A "potentially active" fault is defined as a fault that has shown evidence of surface displacement during the last 1.6 million years, unless direct geologic evidence demonstrates inactivity for the last 11,000 years or longer. This definition does not mean that faults lacking evidence of surface displacement are necessarily inactive. "Sufficiently active" is also used to describe a fault if there is some evidence that displacement occurred in the last 11,000 years on one or more of its segments or branches. (Bryant and Hart, 2007).

SOURCES: Bryant and Hart, 2007; Jennings and Bryant, 2010; Peterson et al., 1996.

Groundshaking

A large magnitude earthquake on any of the above-mentioned fault systems has the potential to cause significant ground shaking at the site. The intensity of groundshaking that is likely to occur at the site is generally dependent upon the magnitude of the earthquake and the distance to the epicenter. Estimates by the Working Group on California Earthquake Probabilities (WGCEP) indicated a 72 percent chance that a magnitude 6.7 or greater earthquake would occur in the Bay Area region over the next 30 years (USGS, 2016). The geotechnical investigation estimated that the Project area has a 39.3 percent of experiencing a MW 6.67 or higher earthquake occurring over the next 50 years (CE&G, 2015). Using tools contained on the U.S. Geological Survey (USGS) website, the geotechnical consultant completed a probabilistic assessment of the earthquake shaking hazard at the site. According to the findings based on the USGS website using Site Class C soils to describe the conditions at the site, the anticipated peak ground acceleration is 0.24g.

Liquefaction

Liquefaction occurs when soil located below the groundwater surface loses a substantial amount of strength due to high excess pore-water pressure generated and accumulated during strong earthquake ground shaking. Recently deposited and relatively loose natural soils, and uncompacted or poorly compacted artificial fills located below the groundwater table are potentially susceptible to liquefaction.

Saturated granular materials that are potentially susceptible to liquefaction are pervasive within the loose lake sediments and sporadic within the dense alluvial soils below lake sediments of Almaden Lake. The Seismic Hazard Zone map prepared by the California

Geological Survey (CGS) for the USGS Santa Theresa Hills and Los Gatos quadrangles indicates that the entire Almaden Lake site and areas adjacent to Alamitos Creek are located within a liquefaction hazard zone. Geotechnical borings results indicate that the lake sediment deposits and some deeper sandy soil layers would likely liquefy during an earthquake event with a 100-year return period. About 75 percent of the liquefaction induced settlement is estimated to occur in the lake sediment deposits.

Lateral Spreading

Lateral spreading occurs as surficial soil displaces along a shear zone that has formed within an underlying continuous liquefied layer. The surficial blocks are transported downslope or in the direction of a free face, such as a channel, by earthquake and gravitational forces. Because the geotechnical investigation encountered materials in the loose lake sediments and alluvial soils below lake sediments that are potentially susceptible to liquefaction, and since the CGS Seismic Hazard Zone map indicates that the entire Project area is located within a liquefaction hazard zone, lateral spreading may have the potential to occur on the Project site.

Cyclic Densification

Cyclic densification can occur in non-saturated sand (sand above the groundwater table) caused by earthquake vibrations, resulting in settlement of the ground surface. The geotechnical investigation encountered varying amounts of sand mixed with gravel, silt, and/or clay in the artificial fill and the alluvial deposits underneath the artificial fill. Borings encountered two loose silty and sand layers and a loose poorly graded sand layer, indicating some potential for densification.

Landsliding

Slope stability calculations and analyses show that the current slopes of the existing island are not stable, and as a result have the potential to be susceptible to landsliding during a seismic event. In addition, although the Project area is outside of the earthquake-induced landslide zone, the northeast corner of the Project area abuts an area delineated by the CGS as being an area where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacement such that modifications as defined in Public Resources Code Sec. 2693(c) would be required (CDC, 2003).

Expansive Soils

Expansive soils are characterized by their potential “shrink-swell” behavior. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in certain fine-grained clay sediments from the process of wetting and drying. The higher the percentage of expansive minerals present in near surface soils, the higher the potential for significant expansion. The greatest effects occur when there are significant or repeated moisture content changes. Expansions of 10 percent or more in volume are not uncommon. This change in volume can

exert enough force on a building or other structure to cause cracked foundations, floors, and basement walls over time.

Several soil types identified in the Project vicinity have a range of expansive qualities. Soils along the northern, eastern, and western boundaries of the Almaden Lake shoreline, and at the southern end of the Project site where the Alamitos Creek enters Almaden Lake have a low shrink-swell potential. Soils found in the northeast and southeastern portions of the Project site have a moderate to high shrink-swell potential. Soils located in the northwestern corner of the Project area have a moderate shrink-swell potential. Soils found in the southwestern corner of the Project area have a low to high shrink-swell potential.

Corrosive Soils

Corrosive soils can damage underground utilities including pipelines and cables, can weaken roadway structures, and can degrade uncoated steel. Based on a review of information available through the US Department of Agriculture's Natural Resources Conservation Service, a review specific to the Project site did not identify any soils on site that show potential to corrode steel or concrete (NRCS, 2017). Therefore, corrosive soils are not anticipated on site.

Paleontological Setting

Paleontological resources are the fossilized remains of plants and animals, including vertebrates (animals with backbones), invertebrates (e.g., starfish, clams, ammonites, and marine coral), and fossils of microscopic plants and animals (microfossils). The age and abundance of fossils depend on the location, topographic setting, and particular geologic formation in which they are found. Fossil discoveries not only provide a historical record of past plant and animal life but can assist geologists in dating rock formations. Fossil discoveries can expand our understanding of the time periods and the geographic range of existing and extinct flora and fauna.

The Society of Vertebrate Paleontology (SVP) established guidelines for the identification, assessment, and mitigation of adverse impacts on nonrenewable paleontological resources (SVP, 2010). Most practicing paleontologists in the United States adhere closely to the SVP's assessment, mitigation, and monitoring requirements as outlined in these guidelines, which were approved through a consensus of professional paleontologists. Many federal, state, county, and city agencies have either formally or informally adopted the SVP's standard guidelines for the mitigation of adverse construction-related impacts on paleontological resources. The SVP has helped define the value of paleontological resources and, in particular, indicates that geologic units of *high* paleontological potential are those from which vertebrate or significant invertebrate or plant fossils have been recovered in the past (i.e., are represented in institutional collections). Only invertebrate fossils that provide new information on existing flora or fauna or on the age of a rock unit would be significant. Geologic units of *low* paleontological potential are those that are not known to have produced a substantial body of significant paleontological material. As such, the sensitivity of

an area with respect to paleontological resources hinges on its geologic setting and whether significant fossils have been discovered in the area or in similar geologic units.

The SVP further states the following:

- Vertebrate fossils and fossiliferous deposits are significant nonrenewable paleontological resources, and are afforded protection by federal, state, and local environmental laws and guidelines.
- A paleontological resource is considered to be older than recorded history or 5,000 years before present and should not be confused with archaeological resource sites.
- Invertebrate fossils are not significant paleontological resources, unless they are present with an assemblage of vertebrate fossils or they provide undiscovered information on the origin and character of the plant species, past climatic conditions or the age of the rock unit itself.
- Certain plant or invertebrate fossils may be designated as significant by a project paleontologist, special interest group, lead agency or local government.

With these principles, the SVP has outlined criteria for screening the paleontological potential of rock units and established assessment and mitigation procedures tailored to such potential (SVP, 1996; SVP, 2010). Table 3.H-2 lists the criteria for high-potential, undetermined, and low-potential rock units.

TABLE 3.H-2
PALEONTOLOGICAL POTENTIAL CRITERIA

Paleontological Potential	Description
High	Geologic units from which vertebrate or significant invertebrate or plant fossils have been recovered in the past, or rock formations that would be lithologically and temporally suitable for the preservation of fossils. Only invertebrate fossils that provide new information on existing flora or fauna or on the age of a rock unit would be significant.
Undetermined	Geologic units for which little to no information is available.
Low	Geologic units that are not known to have produced a substantial body of significant paleontological material, as demonstrated by paleontological literature and prior field surveys, and which are poorly represented in institutional collections.

SOURCE: SVP, 2010.

It is important to note that while paleontological potential as defined above can provide a rough idea of whether subsurface fossils may exist, it prescribes a very low threshold for identifying a rock unit as high potential. It would include most sedimentary rock units older than recent, and any other rock types (i.e., igneous or metamorphic) that have yielded a vertebrate or significant invertebrate or plant fossils anywhere within their geographic extents. This low threshold is reasonable; however, being buried resources, the uniqueness or significance of a fossil locality is unknown until it is identified to a reasonably precise level (Scott and Springer, 2004; 5). As such, any fossil discovery should be treated as potentially unique or significant until determined otherwise by a professional paleontologist.

Paleontological Resource Potential

The fossil-yielding potential of a particular area is highly dependent on the geologic age and origin of the underlying rocks. The Project area is directly underlain by a variable thickness of artificial fill or disturbed soil which is typical of an urbanized area, as well as the lake which was a former quarry. Approximately 9 to 19 feet of artificial fill was encountered during the geotechnical investigation (Cal Engineering & Geology, 2015), consisting of variable thicknesses of silt with varying amounts of sand and gravel, lean clay with varying amounts of gravel and sand, well graded sand with gravel and clay, well graded sand with gravel, well graded gravel with sand, silty gravel with sand, asphalt and concrete debris. The natural geology consists of Holocene (less than 10 thousand years ago) alluvial deposits. Such deposits are composed mostly of poorly to moderately consolidated and poorly sorted silty-clay and sand. These alluvial fan deposits likely underlie the disturbed soils at highly variable depths beneath the Project area.

Artificial fills underlying the Project area have little to no potential to yield paleontological resources because they are engineered mixtures of sand, silt, and gravel that have been excavated, reworked, and/or transported to their present location. If artificial fills contain fossilized remains, they would be severely damaged, fragmented, unidentifiable, and could not be placed within the fossil record. Artificial fills and disturbed soils do not represent in situ or native geological deposits, and would thus be unable to yield fossils that could contribute to science or natural history. Underlying artificial fills are natural deposits of Holocene alluvium. Holocene alluvial fan deposits are loose, moderately to well-sorted sandy or clayey silt that form natural levee deposits bordering stream, or over-bank floodplain deposits. Such deposits are geologically immature and are unlikely to have fossilized the remains of organisms (fossilization processes take place over millions of years).

3.H.2 Regulatory Setting

Federal Regulations

There are no federal regulations regarding geology and soils that are relevant to the Project.

State Regulations

Alquist-Priolo Earthquake Fault Zoning Map

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to protect structures for human occupancy from the hazard of surface faulting. In accordance with the Act, the State Geologist has established regulatory zones—called earthquake fault zones—around the surface traces of active faults, and has published maps showing these zones. Buildings for human occupancy cannot be constructed across surface traces of faults that are determined to be active. Because many active faults are complex and consist of more than one branch that may experience ground surface rupture, earthquake fault zones extend approximately 200 to 500 feet on either side of the mapped fault trace. Although a number of faults in the greater vicinity of the Project area are known to be active, no known active faults pass

beneath the Project site, and no element of the Project would be located on a fault that has been formally mapped by the state as being within an Alquist-Priolo Earthquake Fault Zone.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was passed in 1990 following the Loma Prieta earthquake to reduce threats to public health and safety and to minimize property damage caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones, and cities, counties, and other local permitting agencies to regulate certain development projects within these zones.

California Building Code

The California Building Code (CBC), which is codified in Title 24 of the California Code of Regulations, Part 2, was promulgated to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, means of egress to facilities (entering and exiting), and general stability of buildings. The purpose of the CBC is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under State law, all building standards must be centralized in Title 24 or they are not enforceable. The provisions of the CBC apply to the construction, alteration, movement, replacement, location, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

The 2016 edition of the CBC is based on the 2015 International Building Code (IBC) published by the International Code Council. The code is updated triennially, and the 2016 edition of the CBC was published by the California Building Standards Commission on July 1, 2016, and takes effect starting January 1, 2017. The 2016 CBC contains California amendments based on the American Society of Civil Engineers (ASCE) Minimum Design Standard ASCE/SEI 7-10, Minimum Design Loads for Buildings and Other Structures, provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (such as wind loads) for inclusion into building codes. Seismic design provisions of the building code generally prescribe minimum lateral forces applied statically to the structure, combined with the gravity forces of the dead and live loads of the structure, which the structure then must be designed to withstand. The prescribed lateral forces are generally smaller than the actual peak forces that would be associated with a major earthquake. Consequently, structures should be able to: (1) resist minor earthquakes without damage, (2) resist moderate earthquakes without structural damage but with some nonstructural damage, and (3) resist major earthquakes without collapse, but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake. However, it is reasonable to expect that a structure designed in-accordance with the seismic requirements of the CBC should not collapse in a major earthquake.

The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, all of which are used to determine a seismic design category (SDC) for a project. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site; SDC ranges from A (very small seismic vulnerability) to E/F (very high seismic vulnerability and near a major fault). Seismic design specifications are determined according to the SDC in accordance with Chapter 16 of the CBC. Chapter 18 of the CBC covers the requirements of geotechnical investigations (Section 1803), excavation, grading, and fills (Section 1804), load-bearing of soils (1806), as well as foundations (Section 1808), shallow foundations (Section 1809), and deep foundations (Section 1810). For Seismic Design Categories D, E, and F, Chapter 18 requires analysis of slope instability, liquefaction, and surface rupture attributable to faulting or lateral spreading, plus an evaluation of lateral pressures on basement and retaining walls, liquefaction and soil strength loss, and lateral movement or reduction in foundation soil-bearing capacity. It also addresses measures to be considered in structural design, which may include ground stabilization, selecting appropriate foundation type and depths, selecting appropriate structural systems to accommodate anticipated displacements, or any combination of these measures. The potential for liquefaction and soil strength loss must be evaluated for site-specific peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions.

NPDES Construction General Permit

For stormwater discharges associated with construction activity within California, the SWRCB has adopted the General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ (Construction General Stormwater Permit; CGP) to avoid and minimize water quality impacts attributable to such activities. The permit applies to all projects where construction activity disturbs one or more acres of soil. Construction activities subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation. The Construction General Stormwater Permit requires the development and implementation of a stormwater pollution prevention plan (SWPPP); the plan must specify best management practices (BMPs) designed to prevent pollutants from contacting stormwater and to keep all products of erosion from migrating offsite into receiving waters. Examples of typical construction BMPs include scheduling or limiting activities to certain times of year, installing sediment barriers such as silt fence and fiber rolls, maintaining equipment and vehicles used for construction, tracking controls such as stabilizing entrances to the construction site, and developing and implementing a spill prevention and cleanup plan. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, and vehicle and equipment washing and fueling. The SWPPP must be prepared before the construction begins. The CGP is discussed in more detail in Section 3.K, Hydrology and Water Quality.

Local Regulations

City of San José General Plan

EC-3.2. Within seismic hazard zones identified under the Alquist-Priolo Fault Zoning Act, California Seismic Hazards Mapping Act and/or by the City of San José, complete geotechnical and geological investigations and approve development proposals only when the severity of seismic hazards have been evaluated and appropriate mitigation measures are provided as reviewed and approved by the City of San José Geologist. State guidelines for evaluating and mitigating seismic hazards and the City-adopted California Building Code will be followed.

EC-3.10. Require that a Certificate of Geologic Hazard Clearance be issued by the Director of Public Works prior to issuance of grading and building permits within defined geologic hazard zones related to seismic hazards.

EC-4.2. Approve development in areas subject to soils and geologic hazards, including unengineered fill and weak soils and landslide-prone areas, only when the severity of hazards have been evaluated and if shown to be required, appropriate mitigation measures are provided. New development proposed within areas of geologic hazards shall not be endangered by, nor contribute to, the hazardous conditions on the site or on adjoining properties. The City of San José Geologist will review and approve geotechnical and geological investigation reports for projects within these areas as part of the project approval process.

EC-4.4. Require all new development to conform to the City of San José's Geologic Hazard Ordinance.

EC-4.5. Ensure that any development activity that requires grading does not impact adjacent properties, local creeks and storm drainage systems by designing and building the site to drain properly and minimize erosion. An Erosion Control Plan is required for all private development projects that have a soil disturbance of one acre or more, are adjacent to a creek/river, and/or are located in hillside areas. Erosion Control Plans are also required for any grading occurring between October 15 and April 15.

EC-4.7. Consistent with the San José Geologic Hazard Ordinance, prepare geotechnical and geological investigation reports for projects in areas of known concern to address the implications of irrigated landscaping to slope stability and to determine if hazards can be adequately mitigated.

EC-4.10. Require a Certificate of Geologic Hazard Clearance to be issued by the Director of Public Works prior to issuance of grading and building permits within defined geologic hazard zones.

EC-4.11. Require the preparation of geotechnical and geological investigation reports for projects within areas subject to soils and geologic hazards, and require review and implementation of mitigation measures as part of the project approval process.

EC-4.12. Require review and approval of grading plans and erosion control plans (if applicable) prior to issuance of a grading permit by the Director of Public Works.

3.H.3 Impacts and Mitigation Measures

Significance Criteria

Implementation of the Project would have a significant impact on soils and geology if it were to:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.
  - ii) Strong seismic ground shaking.
  - iii) Seismic-related ground failure, including liquefaction.
  - iv) Landslides.
- Result in substantial soil erosion or the loss of topsoil.
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.[3]
- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

Approach to Analysis

No Impact Significance Determinations

Based on the nature of the Project, there would be no impact related to the following criteria:

Expose people or structures to substantial adverse effects due to fault rupture. There are no active faults or other faulting zones defined in Alquist-Priolo maps, or based on other geologic data sources reviewed previously, that intersect the Project site. Therefore, the potential for fault rupture to occur within or even near the Project site is very low and there would be no impact.

Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water. No septic systems (which treat wastewater through ground

[3] The CBC, based on the International Building Code and the now defunct Uniform Building Code, no longer includes a Table 18-1-B. Instead, Section 1803.5.3 of the CBC describes the criteria for analyzing expansive soils.

percolation) or alternative wastewater disposal systems are proposed for this Project. The Project would separate the Alamitos Creek from Almaden Lake, with the goals of improving anadromous fish access to spawning and rearing habitat within the Guadalupe Watershed, and reducing methylmercury levels in the lake. Therefore, the criterion related to soils supporting the use of septic tanks or alternative wastewater disposal systems is not applicable to the Project and is not discussed further.

Impact Summary

Table 3.H-3 provides a summary of geology and soils related impacts by implementation phase (construction and operations).

TABLE 3.H-3
SUMMARY OF GEOLOGY AND SOILS IMPACTS

Impact Statement	Construction	Operation
Impact 3.H-1: The Project would not directly or indirectly cause potential substantial adverse effects involving strong seismic ground shaking.	LS	LS
Impact 3.H-2: The Project would not result in substantial soil erosion or loss of the topsoil.	LS	LS
Impact 3.H-3: The Project is located on a geologic unit or soil that could become unstable, but would not cause landsliding, lateral spreading, subsidence, liquefaction, or collapse.	LS	LS
Impact 3.H-4: The Project would not expose people or structures to substantial direct or indirect risks to life or property related to expansive or corrosive soils, as defined by the Uniform Building Code.	LS	LS
Impact 3.H-5: The Project would not directly or indirectly destroy a unique paleontological resource or site or unique geological feature.	LS	NI

NI = No impact
LS = Less than significant

Impacts and Mitigation Measures

Impact 3.H-1: The Project would not directly or indirectly cause potential substantial adverse effects involving strong seismic ground shaking. (Less than Significant)

Construction and Operation Impacts

As discussed in the Environmental Setting, the Project site is located in a seismically active region that contains a number of active faults. If not designed appropriately, an earthquake on one of these regional active faults could produce significant groundshaking at the Project site, causing damage to structures, including earthen structures, hardscape structures, and facilities.

Earthquakes are unavoidable hazards, and the resultant damage can be minimized through appropriate seismic design and engineering practices. The District would design the Project in compliance with all requirements of the CBC. Therein, the Project would be required to meet the latest standards of the CBC for construction, which considers proximity to potential seismic sources and the maximum anticipated groundshaking possible. The construction

under the Project would be required to be in accordance with the most recent version of the CBC, which requires structural design that can accommodate ground accelerations expected from known active faults according to site-specific seismic design criteria.

The final design level geotechnical report for the Project would be reviewed and approved by the District for Geological Hazard Review. This review would ensure that seismic design requirements would be incorporated into construction specifications. Compliance with the building safety design standards of the CBC would reduce impacts associated with ground shaking to a less than significant level.

Mitigation Measures

None required.

Impact 3.H-2: The Project would not result in substantial soil erosion or loss of topsoil. (Less than Significant)

Construction Impacts

Construction activities associated with grading, stockpiling of soils, trenching, heavy machinery use, and other activities proposed under the Project, would involve earthwork activities. These activities would result in disturbance of existing soil layers. Additionally, draining of the lake and construction within the lake bottom would cause disturbance to lake bottom sediments. As discussed in Section 3.K, Hydrology and Water Quality, Project construction activities would be required to adhere to the conditions of the California Statewide General Construction Permit (General Permit). Adherence to this permit would require implementation of construction BMPs, as detailed in a SWPPP, as required by the General Permit, under the National Pollutant Discharge Elimination System (NPDES) program. These measures will be implemented, in accordance with state requirements, to minimize soil and sediment erosion on site, thereby minimizing soil erosion or loss of topsoil. Thus, with adherence to the required BMPs, construction related erosion would be minimized. Following completion of construction activities, remaining exposed areas that had been disturbed would be revegetated, which would limit potential for erosion on site. Therefore, with adherence to conditions of the General Permit, Project construction would not result in significant soil erosion impacts. This impact is considered less than significant. For additional discussion of soil erosion and sedimentation, please refer to Section 3.K, Hydrology and Water Quality.

Operations Impacts

Project operation would include conveyance of water along the restored Alamitos Creek channel, as well as management of stormwater on the remainder of the Project site. As noted above, all disturbed areas remaining barren following completion of earthwork on site would be immediately revegetated, prior to the initiation of operation. As discussed in Chapter 2, Project Description, native riparian vegetation would be planted along both sides

of the levee, along the restored Alamitos Creek, and along the banks of the new/expanded islands. The lower west bank bench area of Alamitos Creek adjacent to the new expanded park area would be planted with wetland vegetation, while park areas would have ground cover, such as gravel, mulch, trees, lawn, etc. Other areas would be revegetated with native or ornamental landscaping species, with no areas left barren. Comprehensive revegetation of the Project site would maintain the topsoil and reduce soil erosion. This impact is considered less than significant.

Operation of the restored Alamitos Creek channel would involve the conveyance of water along the new channel. Erosion related impacts associated with the conveyance of water along the channel are discussed in Section 3.K, Hydrology and Water Quality, and are not further considered here.

Mitigation Measures

None required.

Impact 3.H-3: The Project is located on a geologic unit or soil that could become unstable, but would not cause landsliding, lateral spreading, subsidence, liquefaction, or collapse (Less than Significant)

Construction and Operations Impacts

As discussed in the setting section above, the Project site is likely to include shallow groundwater, at levels ranging from 9 to 18 feet below ground surface (subject to seasonal fluctuation). Groundwater levels immediately adjacent to the existing lake may be higher. Saturated loose, unconsolidated soils in areas of shallow groundwater underlying the Project site could potentially be susceptible to liquefaction. Additionally, a liquefaction analysis was completed as an element of the site specific geotechnical investigation (see Appendix D). Results from that analysis indicate that the lake bottom sediments and some deeper sandy soil layers would likely liquefy during an earthquake having a 100-year return frequency. Liquefaction induced settlement of about 2 to 6 inches was estimated within the scope of the geotechnical investigation, with numbers toward the higher end of this range settlement likely in lake bottom sediments. Other areas outside of the levee embankment construction area also include subsurface sediments that are susceptible to liquefaction and, potentially, lateral spreading.

The site specific geotechnical investigation provided recommendations to address geotechnical measures to minimize the potential for liquefaction, which have been incorporated into the Project. These recommendations include removal of lake sediments within the foundation footprint of the levee and, and the placement of engineered fill. The geotechnical investigation also determined that slope gradients at 2 to 1 would be stable, including for water-saturated locations. The design recommendations conform to this gradient, and furthermore are in general conformance with the U.S. Army Corps of Engineers

(USACE) engineering manual regarding the design and construction of levees (EM1110-2-1913). In addition, for other improvements, Chapter 16 of the CBC requires a final design level geotechnical report to be prepared for the Project prior to commencement of earthwork activities and engineering review and approvals to provide design level recommendations for the overall Project to reduce potential liquefaction hazards to less than significant levels. Liquefaction and lateral spreading hazards are generally addressed through foundation design, treatment of site soils, and/or replacement of liquefiable soils with engineered fills. The recommendations are then incorporated into building design plans in accordance with CBC requirements. Adherence to USACE levee construction standards and applicable building code requirements using geotechnical design measures outlined in the final design level geotechnical report and approved by the District, would minimize the potential for effects related to liquefaction and lateral spreading. Implementation of these building code requirements and geotechnical measures would ensure that seismically-induced ground failure including liquefaction and lateral spreading would be a less than significant impact to proposed development.

Mitigation Measures

None required.

Impact 3.H-4: The Project would not expose people or structures to substantial direct or indirect risks to life or property related to expansive soils, as defined by the Uniform Building Code. (Less than Significant)

Construction and Operation Impacts

The Project site covers a large area with a range of underlying soil profiles but generally characterized by artificial fill, lake sediments, and alluvial deposits. According to the preliminary geotechnical investigation conducted for the Project, collected soil samples at the site were found to have plasticity index values ranging from 3 to 36 percent (CE&G, 2015). Soils with plasticity index values that exceed 25 percent are considered to have a high potential for expansion, while below 10 percent is considered to be very low.

In accordance with building code requirements and USACE guidelines for levee construction, site-specific design criteria would include minimum standards for any imported fill materials. The preliminary geotechnical recommendations for the Project include plasticity index limits of between 10 and 20 percent for the levee fill materials and not less than 8 percent for the clay cap over the mercury-laden sediments in the lake (CE&G, 2015). The CBC includes provisions for construction on expansive soils which can generally be addressed through replacement with engineered fill or treatment onsite. Proper fill selection, moisture control, and compaction during construction can prevent expansive soils from causing significant damage. As a result, the Project would not expose people or structures to substantial direct or indirect risks to life or property related to expansive soils. Continued compliance with the CBC, the preliminary geotechnical investigation recommendations, and USACE guidelines for levee construction would ensure that this impact would be less than significant.

Mitigation Measures

None required.

Impact 3.H-5: The Project could directly or indirectly destroy a unique paleontological resource or site or unique geological feature. (Less than Significant)

The paleontological analysis identifies the potential to encounter paleontological resources (i.e., plant, animal or invertebrate fossils or microfossils) during excavations associated with the Project. The paleontological potential of the units to be disturbed was determined, and the potential to encounter paleontological resources at each site was evaluated. A significant impact on paleontological resources would occur if: (1) construction of the Project were to move or excavate previously undisturbed geologic bedrock (native rock); and (2) the bedrock were to be disturbed has a high paleontological potential.

As discussed in the setting, the Project area, the location of a former quarry, has no unique geological features and little to no potential to yield paleontological resources because it is predominantly underlain by artificial fills, which are engineered mixtures of sand, silt or gravel that would not contain unique or significant fossils. Excavation and earthwork associated with Project construction could possibly encounter Holocene alluvium as well; however, this unit is unlikely to contain paleontological resources because the area is highly disturbed from previous construction and ongoing maintenance and the minimal depth of disturbance in native soils. Thus, construction-related impacts on paleontological resources would be less than significant.

Based on the nature of the Project, there would be no impact on paleontological resources or unique geological features related to operations. Since operation and maintenance would not involve excavation work, there would not be any direct or indirect impacts on paleontological resources.

Mitigation Measures

None required.

3.H.4 References

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3.I Greenhouse Gas Emissions

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to greenhouse gas (GHG) emissions, and includes an analysis of impacts related to GHG emissions from the Project. For the purposes of this assessment, the following topics are considered: an overview of climate change; a review of the various GHGs that have been identified as drivers of climate change; pertinent regulations, including those relevant at federal, state, and local levels; significance criteria for environmental impacts; and impacts and appropriate mitigation measures associated with Project construction and operation. Air quality emissions, including criteria air pollutants, are considered in Section 3.C, Air Quality. If needed, District best management practices (BMPs) and mitigation measures to avoid or reduce significant impacts are also identified.

3.I.1 Environmental Setting

Climate Change

There is general scientific consensus that climate change is occurring and is almost certainly attributed to human activities. Man-made emissions of GHGs, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Strong scientific evidence documents that the climate is changing and that its impacts are widespread and occurring now. In California, this evidence includes increases in extreme heat, wildfires, extreme storms, coastal flooding and erosion, and reductions in Sierra Nevada springtime snow pack and threats to water availability (CARB, 2014). Globally, climate change has the potential to adversely affect numerous environmental resources through potential, though uncertain, impacts related to future air and water temperatures, precipitation patterns, and an array of other factors. According to the International Panel on Climate Change (IPCC), several indicators of climate change are advancing faster than in previous assessments (IPCC, 2014):

- Changing precipitation and snow melt patterns;
- Negative effect on crop yield;
- Increased heat waves, drought, flood, wildfires, and storm events;
- Reduced renewable water resources in most dry subtropical regions; and
- Ocean acidification damage to marine ecosystems.

Also, there are many secondary effects projected to result from global warming, including impacts to agriculture, changes in disease vectors, changes in habitat suitability, and potential for reduction of biodiversity. While the possible outcomes and the feedback mechanisms involved are not fully understood and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term may be great.

Greenhouse Gases

GHG emissions that result from human activities primarily include carbon dioxide (CO_2), with much smaller amounts of nitrous oxide (N_2O), methane (CH_4, often from unburned natural gas), sulfur hexafluoride (SF_6) from high-voltage power equipment, and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. Because these GHGs have different warming potentials (i.e., the amount of heat trapped in the atmosphere by a certain mass of the gas), and CO_2 is the most common reference gas for climate change, GHG emissions are often quantified and reported as CO_2-equivalent (CO_2e) emissions. For example, while SF_6 represents a small fraction of the total annual GHGs emitted worldwide, this gas is very potent, with 22,800 times the global warming potential (GWP) of CO_2. Therefore, an emission of 1 metric ton of SF_6 would be reported as 22,800 metric tons CO_2e. The GWP of CH_4 and N_2O are 25 times and 298 times that of CO_2, respectively (CARB, 2016).

Statewide emissions of GHG from relevant source categories for 2010 through 2016 are summarized in Table 3.I-1. Specific contributions from individual air basins, such as the San Francisco Bay Area Air Basin, which encompasses the Project area, are included in the emissions inventory but are not itemized by air basin. In 2016, California produced 429.34 million gross metric tons of CO_2e emissions. Transportation was the source of 41 percent of the state's GHG emissions, followed by industrial at 23 percent, electricity generation at 16 percent, commercial and residential sources at 12 percent, and agriculture and forestry comprised the remaining 8 percent (CARB, 2018).

TABLE 3.I-1
CALIFORNIA GHG EMISSIONS (MILLION METRIC TONS CO_2E)

Emission Inventory Category	2010	2011	2012	2013	2014	2015	2016	
Electricity Generation (In State)	46.91	41.37	51.18	49.6	51.81	50.21	42.67	10%
Electricity Generation (Imports)	43.67	46.94	44.15	40.24	36.56	33.88	26.28	6%
Transportation	170.16	166.52	166.16	165.8	167.14	170.89	174.01	41%
Industrial	100.93	100.63	100.89	103.75	104.23	102.1	100.37	23%
Commercial	20.09	20.73	21.11	21.64	21.37	22.07	23.04	5%
Residential	31.26	32.03	30.04	31.19	26.26	27.05	28.34	7%
Agriculture and Forestry	34.27	34.89	36.08	34.61	35.95	34.41	33.84	8%
Not Specified (Solvents & Chemicals)	0.82	0.79	0.78	0.77	0.78	0.79	0.79	0%
Total Gross Emissions	448.11	443.9	450.39	447.6	444.1	441.4	429.34	100%

NOTE: The GHG percentages of the total gross emissions for year 2016 were rounded to the nearest whole number.

SOURCE: CARB, 2018.

Greenhouse Gas Sources

There is an important distinction between the two general sources of GHG emissions:

- *Anthropogenic* GHG emissions derived from the combustion of fossil fuels. Energy-related CO_2 emissions, resulting from fossil fuel exploration and use, account for approximately three-quarters of the human-generated GHG emissions in the United States, primarily in the form of CO_2 emissions from burning fossil fuels. More than half of the energy-related emissions come from large stationary sources such as power plants; approximately one-third derive from transportation; while industrial processes, agriculture, forestry, other land uses, and waste management compose a majority of the remaining sources (U.S. EPA, 2016a). Anthropogenic emissions also include by-products of certain human-managed biological processes, such as anaerobic decomposition of organic waste in landfills, wastewater treatment, and treatment of wastes from confined animal facilities such as dairies.
- *Biogenic* GHG emissions are derived from natural sources, including the natural decomposition of biomass[1] and combustion of biomass or biomass-derived fuels.

The distinction between anthropogenic and biogenic sources of GHG emissions is important because these sources have different impacts on the global carbon cycle. Carbon in fossil fuel reservoirs, such as coal seams and oil and gas deposits, was removed from the atmosphere by plants over millions of years. Through geologic processes, this carbon accumulated in deposits and was isolated from the active carbon cycle. Without human intervention, fossil-fuel carbon would remain isolated from the active carbon cycle into the future. Through extraction and combustion of fossil fuels, humans release this carbon, increasing the total amount of carbon in the atmosphere and in the active carbon cycle.

In contrast to fossil-fuel carbon, carbon present in biomass is cycling through the atmosphere and global carbon cycle on a much faster scale. For example, over the course of a year, carbon removed from the atmosphere by growing agricultural crops is released back into the atmosphere through the harvest, and subsequent respiration, decomposition, or combustion of the produced/residual biomass. Over short time scales, the carbon mass released by the decomposition of biomass will generally equal the carbon mass taken up by living organisms. Because biogenic carbon is constantly being released and taken up in the carbon cycle, biogenic CO_2 emissions do not act to increase the total amount of carbon in the atmosphere in the same way as the release of carbon from fossil fuels (U.S. EPA, 2014).

[1] Biomass is non-fossilized organic matter from plants, animals, and microorganisms, including products, byproducts, and wastes from agriculture, forestry and related industries, as well as the non-fossilized biodegradable fractions of industrial and municipal wastes, including gases and liquids recovered from its decomposition.

3.I.2 Regulatory Setting

Federal Regulations

U.S. Environmental Protection Agency (U.S. EPA)

On April 2, 2007, in *Massachusetts v. U.S. EPA*, 549 US 497, the Supreme Court found that GHGs are air pollutants covered by the Clean Air Act. The Court held that the U.S. EPA must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the U.S. EPA is required to follow the language of Section 202(a) of the Clean Air Act, which obligates it to prescribe (and from time to time revise) standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines. The Supreme Court decision resulted from a petition for rulemaking under Section 202(a) filed by more than a dozen environmental, renewable energy, and other organizations.

On April 17, 2009, the U.S. EPA Administrator signed proposed "endangerment" and "cause or contribute" findings for GHGs under Section 202(a) of the Clean Air Act. The U.S. EPA found that six GHGs, taken in combination, endanger both the public health and the public welfare of current and future generations. The U.S. EPA also found that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the greenhouse effect as air pollution that endangers public health and welfare under Clean Air Act Section 202(a). Pursuant to 40 CFR Part 52, Proposed Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, U.S. EPA has mandated that Prevention of Significant Deterioration (PSD) and Title V requirements apply to facilities whose stationary source CO_2e emissions exceed 100,000 tons per year (U.S. EPA, 2016b).

U.S. Supreme Court Decision in Utility Air Regulatory Group v. U.S. EPA

On June 23, 2014, the U.S. Supreme Court held that U.S. EPA may not treat GHG emissions as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of best available control technology (BACT). In accordance with the Supreme Court decision, on April 10, 2015, the D.C. Circuit issued an amended judgment in Coalition for Responsible Regulation, Inc. v. U.S. Environmental Protection Agency, which vacated the PSD and Title V regulations under review in that case to the extent that they require a stationary source to obtain a PSD or Title V permit solely because the source emits or has the potential to emit GHGs above the applicable major source thresholds. The D.C. Circuit also directed U.S. EPA to consider whether any further revisions to its regulations are appropriate, and if so, to undertake to make such revisions. In response to the Supreme Court decision and the D.C. Circuit's amended judgment, the U.S. EPA intends to conduct future rulemaking action to make appropriate revisions to the PSD and operating permit rules (U.S. EPA, 2016b).

State Regulations

There are a variety of statewide rules and regulations that have been implemented or are in development in California that mandate the quantification or reduction of GHGs. Under CEQA, analysis and mitigation of GHG emissions and climate change in relation to a proposed project is required where the lead agency determines that a project would result in a significant addition of GHGs to the atmosphere.

Executive Order S-3-05

Executive Order S-3-05 was established by Governor Arnold Schwarzenegger in June 2006 and establishes statewide emission reduction targets through the year 2050 as follows:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

This executive order does not include any specific requirements that pertain to the Project; however, future actions taken by the state to implement these goals may affect the Project, depending on the specific implementation measures that are developed.

Assembly Bill 32

California Assembly Bill (AB) 32, *the Global Warming Solutions Act of 2006*, required the California Air Resources Board (CARB) to establish a statewide GHG emissions cap for 2020 based on 1990 emission levels. AB 32 required CARB to adopt regulations that identify and require selected sectors or categories of emitters of GHGs to report and verify their statewide GHG emissions, and CARB is authorized to enforce compliance with the program. Under AB 32, CARB also was required to adopt a statewide GHG emissions limit equivalent to the statewide GHG emissions levels in 1990, which must be achieved by 2020. CARB updated its established limit from December 2007 to 431 million metric tons of CO_2e based on updated GWPs from the IPCC's Fourth Assessment Report. This is approximately 15 percent below forecasted "business-as-usual" emissions of 509 million metric tons of CO_2e in 2020 (CARB, 2014). In the interest of achieving the maximum technologically feasible and cost-effective GHG emission reductions, AB 32 permits the use of market-based compliance mechanisms and requires CARB to monitor compliance with and enforce any rule, regulation, order, emission limitation, emissions reduction measure, or market-based compliance mechanism that it adopts.

Climate Change Scoping Plan (AB 32 Scoping Plan)

In December 2008, CARB approved the AB 32 Scoping Plan outlining the State's strategy to achieve the 2020 GHG emissions limit. The Scoping Plan estimates a reduction of 174 million metric tons CO2e (about 191 million tons) from the transportation, energy, agriculture, forestry, and high climate-change-potential sectors, and proposes a comprehensive set of actions designed to reduce overall GHG emissions in California,

improve the environment, reduce dependence on oil, diversify California's energy sources, save energy, create new jobs, and enhance public health.

Appendices C and E of the adopted 2008 AB 32 Scoping Plan include a list of 39 recommended action measures to reduce GHG emissions (CARB, 2009). Of these measures, none are directly relevant to the Project. The AB 32 Scoping Plan must be updated every five years to evaluate the adopted mix of AB 32 policies to ensure that California is on track to achieve the 2020 GHG reduction goal. CARB has released two Scoping Plan Updates in May 2014 and November 2017 (for additional information about the 2017 Scoping Plan Update, refer to *Executive Order B-30-15* discussion, below). There are no recommended actions identified in the Scoping Plan Update that are directly applicable to the Project.

Senate Bill 97

In 2007, the California State Legislature passed Senate Bill (SB) 97, which required amendment of the CEQA Guidelines to incorporate analysis of, and mitigation for, GHG emissions from projects subject to CEQA. The amendments took effect March 18, 2010. The amendments add Section 15064.4 to the CEQA Guidelines, specifically addressing the potential significance of GHG emissions. Section 15064.4 neither requires nor recommends a specific analytical methodology or quantitative criteria for determining the significance of GHG emissions. Rather, the section calls for a "good faith effort" to "describe, calculate, or estimate" GHG emissions and indicates that the analysis of the significance of any GHG impacts should include consideration of the extent to which the project would:

- Increase or reduce GHG emissions;
- Exceed a locally applicable threshold of significance; or
- Comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions."

The CEQA Guidelines also state that a project may be found to have a less than significant impact related to GHG emissions if it complies with an adopted plan that includes specific measures to sufficiently reduce GHG emissions (Section 15064(h)(3)). Importantly, however, the CEQA Guidelines do not require or recommend a specific analytical methodology or provide quantitative criteria for determining the significance of GHG emissions.

Executive Order B-30-15

In April 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. Reaching this emission reduction target will make it possible for California to reach its ultimate goal of reducing emissions 80 percent under 1990 levels by 2050, as identified in Executive Order S-3-05. Executive Order B-30-15 also specifically addresses the need for climate adaptation and directs state government to:

- Incorporate climate change impacts into the state's Five-Year Infrastructure Plan;

- Update the Safeguarding California Plan, the state climate adaption strategy to identify how climate change will affect California infrastructure and industry and what actions the state can take to reduce the risks posed by climate change;
- Factor climate change into state agencies' planning and investment decisions; and
- Implement measures under existing agency and departmental authority to reduce GHG emissions (OGB, 2015).

Executive Order B-30-15 required CARB to update the AB 32 Climate Change Scoping Plan to incorporate the 2030 target. CARB adopted the 2017 Scoping Plan for achieving the 2030 target, which takes into account the key programs associated with implementation of the AB 32 Scoping Plan--such as GHG reduction programs for cars, trucks, fuels, industry, and electrical generation--and builds upon, in particular, existing programs related to the Cap-and-Trade Regulation; the Low Carbon Fuel Standard; much cleaner cars, trucks, and freight movement; power generation for the State using cleaner renewable energy; and strategies to reduce methane emissions from agricultural and other wastes by using it to meet the State's energy needs. The 2017 Scoping Plan also addresses, for the first time, GHG emissions from natural and working lands, including the agriculture and forestry sectors (CARB, 2017).

Senate Bill 32 and Assembly Bill 197

On August 23, 2016, the California Assembly passed SB 32, legislation that would extend California's landmark climate change legislation to require that California reduce its emissions to 40 percent below 1990 levels by 2030, an extension of AB 32's goal to reduce emissions to 1990 levels. SB 32 became fully enacted the next day when AB 197 was passed, as an amendment to SB 32 stated that it would only become operative if AB 197 was enacted. AB 197's key components are:

- Directs CARB to enact environmental justice and social costs when designing climate change regulations.
- Creates a new entity called the Joint Legislative Committee on Climate Change Policies, authorized to do fact-finding and make recommendations to the Legislature regarding the state's climate change programs.
- Makes substantial changes to how CARB functions, increasing the board member size, adjusting the terms of service, and strengthens the board member service disqualification process.
- Intention to decrease CARB's reliance on cap-and-trade to achieve reductions and instead directs CARB to prioritize direct emission reductions at large stationary sources.

Local Policies

Bay Area Air Quality Management District (BAAQMD)

The BAAQMD lays the groundwork for GHG emissions reductions through the 2017 Clean Air Plan (2017 CAP). The 2017 CAP provides a long-term vision of how the Bay Area could and function in a year 2050 post-carbon economy, and describes a control strategy that the

BAAQMD will implement over the next 3 to 5 years. The 2017 CAP also includes measures designed to reduce GHG emissions.

City of San José

The City has several documents that guide the reduction of GHG emissions, including the *Envision San José 2040 General Plan* (General Plan), Municipal Code, and several GHG-specific documents and policies, described below.

Envision San José 2040 General Plan and the Greenhouse Gas Reduction Strategy

The General Plan has several policies related to GHG emissions. The policies generally encourage the City to reduce GHG emissions by implementing the Urban Village Planning process to reduce vehicle miles travelled and to review the City's progress in implementing the City Council's Climate Action Plan/Greenhouse Gas Reduction Strategy.

The General Plan includes a Greenhouse Gas Reduction Strategy (GHG Reduction Strategy) embedded in its policies and programs that are designed to help the City sustain its natural resources, grow efficiently, and meet state legal requirements for GHG emissions reduction. Multiple policies and actions in the General Plan have GHG implications, including land use, housing, transportation, water usage, solid waste generation and recycling, and reuse of historic buildings.

The General Plan policies that provide for reduced GHG emissions associated with new development and redevelopment are listed in Attachment B of the GHG Reduction Strategy. CEQA review for all development proposals in the City are required to address the consistency of individual projects with the goals and policies in the General Plan designed to reduce GHG emissions. The City's Green Vision, as reflected in these policies, also has a monitoring component that allows for adaptation and adjustment of City programs and initiatives related to sustainability and associated reductions in GHG emissions. The GHG Reduction Strategy is intended to meet the mandates as outlined in the CEQA Guidelines and the recent standards for "qualified plans" as set forth by BAAQMD.

The GHG Reduction Strategy identifies GHG emissions reduction measures to be implemented by development projects in three categories: built environment and energy, land use and transportation, and recycling and waste reduction. Some measures are mandatory for all proposed development projects and others are voluntary. To tier from the City's GHG Reduction Strategy, a project must conform to the GP 2040 Land Use Diagram designation and implement the applicable mandatory measures in Attachment B of the strategy. Compliance with the mandatory measures and voluntary measures required by the City helps ensure an individual project's consistency with the GHG Reduction Strategy.

In identifying the Project's conformance with applicable state and local policies, the City's GHG Reduction Strategy, General Plan, and General Plan EIR only address GHG emissions with respect to building structures (i.e., residential and buildings), not the construction activity itself. Most of the Project's GHG emissions would result from construction activity and would

have relatively low operation emissions from an electric pumping station which is also not specifically addressed by these policy measures. Therefore, these policies are not considered applicable to the Project.

Municipal Code

The City's Municipal Code includes regulations for energy efficiency and energy use. City regulations include a Green Building Ordinance (Chapter 17.84) to foster practices to minimize the use and waste of energy, water, and other resources in the City, Water Efficient Landscape Standards for New and Rehabilitated Landscaping (Chapter 15.10), and a Construction and Demolition Diversion Deposit Program that fosters recycling of construction and demolition materials (Chapter 9.10). Implementation of these regulations reduces GHG emissions during and after site development and redevelopment.

3.I.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR, a GHG emissions impact is significant if the Project would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

With regards to the first GHG impact criterion, CEQA allows for the significance criteria established by the applicable air district to be used to assess the impact of a project relative to GHG emissions. For land use projects with operations that are not stationary sources, the BAAQMD's CEQA Guidelines recommend use of an operational significance threshold of 1,100 metric tons CO_2e per year and for stationary source projects the recommended significance threshold is 10,000 metric tons CO_2e per year (BAAQMD, 2017). Since the Project would include no new stationary operational sources of GHG emissions, the stationary source significance threshold of 10,000 metric tons CO_2e per year is not an appropriate threshold to gauge impact significance of the Project.

Therefore, even though the Project is not a typical land use development project, this EIR nonetheless uses the significance threshold of 1,100 metric tons CO_2e per year to evaluate whether the Project's GHG emissions could have a significant impact on the environment. Use of this threshold results in approximately 59 percent of all projects being above the significance threshold and having to implement feasible mitigation measures to meet their CEQA obligations. These projects account for approximately 92 percent of all GHG emissions anticipated to occur between now and 2020 from new land use development in the Bay Area (BAAQMD, 2017). If all land use-related Project emissions are mitigated to below this threshold, it would represent an overall reduction in new land use project-related emissions of up to 92 percent.

It is acknowledged that this significance threshold was developed to focus on emissions reductions by 2020, and that BAAQMD staff and CARB have not yet provided guidance or recommendations for significance thresholds to evaluate consistency with emissions reduction goals for years beyond 2020. The Executive Order B-30-15 and 2017 Scoping Plan emissions reductions goal of lowering GHG emissions to 40 percent below 1990 levels by 2030 is roughly equivalent to reducing emissions by 40 percent below current levels and the Executive Order S-3-05 emissions reductions goal of lowering GHG emissions to 80 percent below 1990 levels by 2050 is roughly equivalent to reducing emissions by 80 percent below current levels. In addition, BAAQMD does not have quantitative thresholds of significance for GHG emissions from a project's construction. Instead, BAAQMD recommends lead agencies quantify and disclose GHG emissions that would occur during construction and make a determination on the significance of these construction-generated GHG impacts.

In the absence of significance thresholds specifically designed to focus on operational emissions reductions beyond 2020 and construction emissions, the Santa Clara Valley Water District (the District), as the lead agency, has determined that the sum of the Project's annual operation-related GHG emissions and the Project's amortized construction-related GHG emissions over its useful life[2] should be compared to the BAAQMD's operation-related GHG threshold of significance for projects other than stationary sources, which is 1,100 metric tons CO_2e (BAAQMD, 2017).

With regard to the second GHG impact criterion, CEQA Guidelines state that a project may be found to have a less than significant impact related to GHG emissions if it complies with an adopted plan that includes specific measures to sufficiently reduce GHG emissions (Section 15064(h)(3)). As stated above, the Project's GHG emitting activities are not addressed by the City's GHG policies which take into account the state's GHG reduction goals. However, the Project would comply with the City's applicable GHG-related municipal codes.

Approach to Analysis

Construction- and operation-related emissions that would be associated with the Project have been quantified using the methods presented for comparison to a threshold determined by the District as the lead agency. If the estimated Project GHG emissions are over the applicable threshold and cannot be mitigated to below it, the Project's impacts related to generation of GHG emissions could result in a significant impact. The Project has also been evaluated for consistency with the City's GHG Reduction strategy and the state's 2017 Scoping Plan Update. If the Project conforms to the General Plan Land Use / Transportation Diagram and with policies governing the specific land use designation, it can be found to conform to the GHG Reduction Strategy and would result in a less than significant impact. As stated above, the City's GHG Reduction Strategy, General Plan, and General Plan EIR only address GHG emissions with respect to the building structures (i.e., residential and buildings), not the construction activity itself. The Project's GHG emissions would result from construction activity related to the improvement of Almaden Lake and operation of an electric

[2] The Project's useful life is estimated to be 30 years.

pumping station. Therefore, these policies are not considered applicable to the Project for a consistency determination.

Construction Emissions

GHG emissions that would be associated with the on-site and off-site construction-related activity for the Project were estimated using the California Emissions Estimator Model, version 2016.3.2 (CalEEMod). CalEEMod was developed by the South Coast Air Quality Management District and other California air districts for the specific purpose of assisting lead agencies in determining a project's air quality and GHG impacts. The model combines the databases from both CARB's EMFAC and OFFROAD models into a single tool and estimates the Project's GHG emissions producing activities as metric tons CO_2e. A standalone spreadsheet with industry-based locomotive emission calculations was utilized to derive GHG emissions from the rail hauling of mercury-laden sediment removed from Almaden Lake.

Assumptions and calculations were developed in consultation with District staff to reflect each phase of the Project's construction. This information consisted of a phased construction schedule along with a list of off-road construction equipment, worker trips, vendor trips, and hauling trips required to complete the Project. This information was then entered into CalEEMod to produce the Project's annual construction-related GHG mass emissions. CalEEMod defaults were used for Project components in which there were no project-specific data. Appendix B contains the construction schedule, assumptions, emissions summary tables, and CalEEMod output sheets used to quantify the Project's construction GHG emissions.

The District identified two disposal options for lake bed sediment, if it is found to be contaminated: hauling via heavy duty trucks to an approved disposal site in Kettleman City, California or hauling via heavy duty trucks to the Port of Oakland, loaded onto railcars and shipped via rail to an approved disposal site in Utah. In order to provide the most conservative and worst-case scenario, GHG emissions were calculated for the second, farther truck hauling distance with railcar shipping option. A standalone locomotive and railroad spreadsheet containing specific data such as diesel fuel consumption, number of railroad cars needed, railroad car capacities, railroad car weights, etc., was created to quantify GHG emissions from the hauling of removed lake bed sediment. Given that impacts from a project's GHG emissions would be global in nature regardless of where they are emitted, GHG emissions for the entire roundtrip rail distance from Oakland, California, to Salt Lake City, Utah were calculated and added to the Project's on-site and off-site GHG emissions. Appendix B contains the standalone spreadsheet used for these calculations.

Operation Emissions

Operation-related GHG emissions that would be associated with the Project were quantified outside of CalEEMod.

The City of San José would be responsible for maintenance of the new open park area, while anticipated maintenance activities for the District would include embankment and levee inspection and repair, sediment removal from the restored creek, levee settlement adjustment, restored vegetation maintenance and management along the restored creek and islands, lake water quality monitoring, and maintenance road grading and upkeep.

Maintenance of the new park area would be incorporated into existing City maintenance at the park and would not generate new traffic or emissions. Maintenance of the restoration plantings is estimated to require one additional truck trip would occur every two weeks for the first three years after construction of the Project. Maintenance of the new levee would require visits by District crews a couple times a year. Embankment repair and levee settlement adjustment would only be required if necessary; the Project would be designed to be stable and not require such maintenance. Sediment removal is estimated to be needed periodically downstream of the Lake as currently occurs under the Stream Maintenance Program ~~only every ten years~~ and would require a small work crew a week or two to complete the work. The Project would also generate indirect GHG emissions from an electric pump station that would run intermittently.

Impact Summary

Table 3.I-2 provides a summary of impacts to greenhouse gas emissions.

TABLE 3.I-2
SUMMARY OF GREENHOUSE GAS EMISSIONS IMPACTS

Impact Statement	Construction	Operation
Impact 3.I-1: The Project would not generate GHG emissions that would be above the District's threshold of significance for GHG emissions.	LS	LS
Impact 3.I-2: The Project would not conflict with applicable plans, policies, and regulations adopted for the purposes of reducing GHG emissions.	LS	LS

LS = Less than significant

Impacts and Mitigation Measures

Impact 3.I-1: The Project would not generate GHG emissions that would be above the District's threshold of significance for GHG emissions. (Less than Significant)

Construction and Operation Emissions

Table 3.I-3 shows the GHG emissions estimated to be generated by construction activities that would be associated with the Project. The Project's construction would commence no earlier than June ~~2021~~ 2022 and finish in ~~2023~~ 2024. As shown in Table 3.I-3, the Project's construction would generate a total of 5,949 metric tons CO_2e. Refer to Section 3.I.3, Approach to Analysis, for a discussion of the methods used to estimate construction

emissions, and Appendix B, for details on the calculations and assumptions used to estimate the construction emissions.[3]

TABLE 3.I-3
TOTAL ESTIMATED GHG CONSTRUCTION EMISSIONS

Source	CO_2e (metric tons)
On-site and Off-site Construction	5,281
Railroad Hauling	668
Total Construction	5,949

SOURCE: Appendix B.

Future operations of the Project would include maintenance of the restoration plantings for three years, occasional inspection and maintenance of the levee, continued City maintenance of the Park, and sediment removal and bank protection activities. Sediment removal is only anticipated to be needed periodically downstream of the Lake as currently occurs under the Stream Maintenance Program ~~once every ten years~~ and would only last a few weeks in duration. Table 3.I-4 shows the estimated annual GHG emissions that would be directly and indirectly generated each year related to operation and maintenance of the Project. The total estimated annual operation and maintenance emissions that would be associated with the Project are approximately 94 ~~211~~ metric tons CO_2e. For a discussion of the methods used to estimate the operation and maintenance emissions, see the Approach to Analysis section above; for details on the calculations and assumptions used to estimate the operation emissions, refer to Appendix B.

TABLE 3.I-4
TOTAL ESTIMATED GHG OPERATION EMISSIONS

Source	CO2e/year (metric tons)
Energy	94 ~~211~~
Mobile	< 1
Total	94 ~~211~~

SOURCE: Appendix B.

As described in the Approach to Analysis section (above), the District, acting as the lead agency, determined that a comparison to the Project's total amortized construction and operational GHG emissions should be compared to the BAAQMD's operational threshold of significance for non-stationary sources. Table 3.I-5 shows that the Project's total amortized

[3] The projected construction start has been revised to 2022; however, the emission calculations are based on an assumption of a June 2021 construction start, which is a more conservative assumption because the CalEEMod emissions model uses emissions factors for equipment and vehicle inventories that lower emissions each calendar year due to the introduction of new lower-emitting equipment and vehicles each year and the retirement of older higher-emitting equipment and vehicles each year. For this reason, the Draft EIR emission estimates have not been revised to reflect the new Project information (i.e., start date and revisions to Table 2-3), and they continue to represent a conservative estimate for the Project.

construction and operational GHG emissions would be below the applicable threshold. Therefore, this impact would be less than significant.

Mitigation Measures

None required.

TABLE 3.I-5
TOTAL AMORTIZED GHG EMISSIONS

Source	CO2e/year (metric tons)
30-year Total Amortized Construction	198
Total Operation Emissions	94 ~~211~~
Total Amortized Construction and Operation Emissions	409
BAAQMD GHG Mass Emissions Threshold for Non-Stationary Sources	1,100
Threshold Exceeded?	No

SOURCE: Appendix B.

Impact 3.I-2: The Project would not conflict with applicable plans, policies, and regulations adopted for the purposes of reducing GHG emissions. (Less than Significant)

Construction and Operation

Applicable plans, policies, and regulations promulgated by the City are discussed previously. The Project would conform to the General Plan Land Use/Transportation Diagram as the Project site would retain its designation as Open Space, Parklands, and Habitat. The Project would re-establish water efficient landscaping pursuant to Chapter 15.01 of the City's municipal code,[4] and would also re-use on-site up to 80 percent of the cut soil volume, pursuant to the City's Construction and Demolition Diversion Deposit Program that fosters recycling of construction and demolition materials.[5]

As mentioned above, the Project's construction GHG emissions and operational GHG emissions from the pump station are not addressed by the City's GHG Reduction Strategy, General Plan, or General Plan EIR, which directly relate to the state's GHG reduction policies and goals, and although there are no recommended actions identified in the 2017 Scoping Plan Update that are directly applicable to the Project, construction and operations associated with the Project would be consistent with applicable 2017 Scoping Plan

[4] The vegetation and landscaping would be consistent with existing conditions, except that vegetation would be planted in different locations. Therefore, changes in vegetation or landscaping resulting from the Project would not result in a change in vegetation related GHG emissions.

[5] On-site re-use of cut lakebed sediment and soil would occur for sediments that are below the contamination thresholds identified in the Project Description.

provisions. Additionally, as discussed for Impact 3.I-1, the Project would be in conformance with BAAQMD GHG emissions thresholds. Therefore, the Project would comply with the City's applicable municipal codes and other applicable plans, policies, and regulations for reducing GHG emissions, and this impact is considered less than significant.

Mitigation Measures

None required.

3.I.4 References

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3.J Hazards and Hazardous Materials

This section describes the environmental and regulatory setting of the Project area with respect to hazards and hazardous materials, and includes an analysis of hazardous impacts from the Project. District best management practices (BMPs) and mitigation measures to avoid or reduce significant impacts are also identified.

Stream and lake water quality, including issues and impacts surrounding the management of methylmercury as a water quality pollutant are discussed in Section 3.K, Hydrology and Water Quality.

3.J.1 Environmental Setting

Definition of Hazardous Materials

A hazardous material is defined as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment (State Health and Safety Code Chapter 6.95, Section 25501(o)). The term “hazardous materials” refers to both hazardous substances and hazardous wastes. Under federal and state laws, any material, including wastes, may be considered hazardous if it is specifically listed by statute as such or if it is toxic (causes adverse human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases).

Hazardous wastes are hazardous substances that no longer have practical use, such as materials that have been spent, discarded, discharged, spilled, contaminated, or are being stored until they can be disposed of properly (Title 22 California Code of Regulations [CCR] Section 66261.10). Soil that is excavated from a site containing hazardous materials is a hazardous waste if it exceeds specific 22 CCR criteria (Sections 66261.20 through 66261.24). While hazardous substances are regulated by multiple agencies, as described in the Regulatory Setting below, cleanup requirements of hazardous wastes are determined on a case-by-case basis according to the agency with lead jurisdiction over the project.

Preschools, schools, daycare centers, nursing homes, and hospitals are considered sensitive receptors for hazardous materials because children and the elderly are more susceptible than adults to the effects of many hazardous materials.

Regional Setting

Almaden Lake is a former quarry located on Alamitos Creek and downstream of the former New Almaden Mining District (RWQCB, 2008; SCVWD, 2015). This mining district included former mines that produced mercury used to extract gold during the California gold rush and continued to extract mercury up until about 1970. Because mining waste was not contained on these mine sites, the wastes continue to erode and discharge mercury-laden sediments to streams in the watershed. The mercury-laden sediments are transported by rivers and

streams, and migrate to reservoirs, lakes, shallow impoundments, and wetland areas, where mercury is converted to methylmercury under anoxic (oxygen-deficient) conditions. Methylmercury is taken up into the food chain, including fish, where it is toxic to humans and piscivorous predators.

In 1987, Santa Clara County issued a fish consumption advisory for mercury contamination. Mercury concentrations in fish tissue that exceed the U.S. EPA human health mercury fish criterion (0.3 milligrams per kilogram [mg/kg]) have been measured at numerous creeks and reservoirs in the Guadalupe River Watershed. In October 2008, the San Francisco Bay Regional Water Quality Control Board (RWQCB) adopted a Total Maximum Daily Load (TMDL) for mercury in the Guadalupe River Watershed into its San Francisco Bay Basin Water Quality Control Plan, as discussed below in Section 3.J.2, Regulatory Setting, Basin Plan and TMDL (RWQCB, 2008). TMDLs are actions required by the RWQCB to restore clean water.

Project Area

Chemicals at the Project Site

Several soil sampling events have been conducted to test for the presence of mercury and other chemicals in lake bottom sediments. The more recent results are compared to action levels to indicate the appropriate management of the sediments and are summarized below.

Lake Bottom Sediments

On October 7 and 8, 2014, the District contracted to have the sediments at the bottom of the lake sampled using a barge-mounted drill rig to evaluate chemical concentrations, particularly mercury (CE&G, 2015). Four sediment samples were analyzed for CAM 17 metals, a suite of metals that includes antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc (LASC, 2015). The results were compared to Environmental Screening Levels (ESLs; per RWQCB, December 2013) and to California thresholds for hazardous waste classification (Total Threshold Limit Concentrations [TTLCs]). ESLs are used to assess whether further action is necessary relative to cleaning up a given site. TTLCs are used as acceptance criteria for landfills to determine whether a material is classified as hazardous or non-hazardous waste. The analytical results are summarized below in Table 3.J-1. The analytical results for arsenic, mercury, and nickel in some samples exceeded the ESLs, indicating that further investigation and cleanup would be needed to address the detected chemicals. The analytical results for mercury in some samples exceeded the TTLCs, indicating that if these sediments are excavated and sent for offsite disposal, the sediments would have to be sent to a Class I landfill permitted to accept hazardous waste.

TABLE 3.J-1
SUMMARY OF LAKE BOTTOM SEDIMENT CHEMICAL RESULTS

Sample/ Chemical	WB-1-3 (3-3.5 feet)	WB-1-4 (8 feet)	WB-1-4 (3.5-4 feet)	WB-2-4 (9,5-10 feet)	ESLs	TTLCs
Antimony	0.85	1.2	1.4	0.54	20	500
Arsenic	5	3.4	5.7	6.6	0.39	500
Barium	91	79	110	120	750	10,000
Beryllium	ND	ND	0.16	0.17	4	75
Cadmium	0.15	ND	0.18	0.26	12	100
Chromium	120	93	100	77	1,000	2,500
Cobalt	16	15	16	13	23	8,000
Copper	29	39	25	25	230	2,500
Lead	11	3.1	26	47	80	1,000
Mercury	29	4.5	26	17	6.7	20
Molybdenum	ND	ND	ND	ND	40	3,500
Nickel	190	130	180	140	150	2,000
Selenium	ND	ND	ND	ND	10	100
Silver	ND	ND	ND	ND	20	500
Thallium	ND	ND	ND	ND	0.78	700
Vanadium	40	61	37	34	200	2,400
Zinc	56	65	52	63	800	5,000

NOTES:

Exceedances bolded/grey
All concentrations in milligrams per kilogram (mg/kg)
ND = not detected above the laboratory reporting limit
Concentrations in bold text exceed the TTLC
ESLs = Environmental Screening Levels, RWQCB, December 2013
TTLC = Total Threshold Limit Concentrations, California Code of Regulations, Title 22, Division 4.5, Chapter 11, Article 3, Section 66261.24(a)(2)

SOURCE: LASC, 2015

Shoreline Soil

On February 26, 27, and 28, 2014, the District contracted to have the soil around the shoreline of the lake sampled using a hand auger to evaluate reuse or disposal options in areas that may be graded (LASC, 2014). Sixteen soil samples were analyzed for CAM 17 metals. The results were compared to ESLs and TTLCs. The analytical results are summarized below in Table 3.J-2.

None of the concentrations exceeded TTLCs indicating the shoreline soil is not considered to be a hazardous waste. Some of the samples exceeded the ESL concentrations for arsenic, cobalt, mercury, and nickel. However, LASC concluded that the detected concentrations are consistent with naturally-occurring background concentrations for these metals in Bay Area soils. LASC concluded there are no restrictions on reusing or disposing of the shoreline soils.

TABLE 3.J-2
SUMMARY OF SHORELINE SOIL CHEMICAL RESULTS

Chemical	Sample Number (1408 - #)																ESLs	TTLCs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
Antimony	<0.42	<0.48	<0.74	<0.50	<0.97	<0.38	<0.45	<0.49	3.3	8.6	1.4	2.7	1.6	1.1	1.6	1.1	20	500
Arsenic	3.3	3	2.4	2.2	12	<0.76	1.5	1.8	5.6	5.7	3.3	4.1	4.3	5	4.8	6.3	0.39	500
Barium	62	110	67	83	91	13	44	54	98	78	61	88	82	57	79	79	750	10,000
Beryllium	<0.085	0.2	<0.074	<0.10	0.28	<0.076	<0.091	0.11	<0.076	<0.095	<0.081	<0.091	<0.088	<0.083	<0.095	<0.097	4	75
Cadmium	<0.11	<0.12	<0.18	<0.13	<0.24	<0.095	<0.11	<0.12	<0.19	<0.24	<0.10	<0.23	<0.11	<0.21	<0.24	<0.12	12	100
Chromium	51	100	83	28	36	3.6	43	95	78	130	74	220	92	60	120	74	1,000	2,500
Cobalt	9	13	15	19	13	0.67	8.2	29	17	23	13	19	15	17	16	14	23	8,000
Copper	20	19	22	15	39	1.4	16	14	17	25	14	29	25	27	22	25	230	2,500
Lead	5.4	9.2	3.1	2.5	8.2	0.94	1.9	1.9	4.9	12	2.3	2.6	5.9	1.8	3.7	6.6	80	1,000
Mercury	18	0.55	16	0.15	5.5	0.024	0.4	0.28	7.6	5.9	5.5	0.37	5	1.5	2.3	3.8	6.7	20
Molybdenum	<0.42	<0.48	<0.37	<0.50	<0.49	<0.38	<0.45	<0.49	<0.38	<0.48	<0.40	<0.45	0.53	<0.42	<0.48	<0.49	40	3,500
Nickel	57	130	110	140	53	2.7	44	600	160	230	110	180	120	290	140	110	150	2,000
Selenium	<0.42	<0.48	<0.74	<0.50	<0.97	<0.38	<0.45	<0.49	<0.76	<0.95	<0.40	<0.91	<0.44	<0.83	<0.95	<0.49	10	100
Silver	<0.21	<0.24	<0.37	<0.25	<0.49	<0.19	<0.23	<0.25	<0.38	<0.48	<0.20	<0.45	0.22	<0.42	<0.48	<0.24	20	500
Thallium	<0.42	<0.48	<0.74	<0.50	<0.97	<0.38	<0.45	<0.49	<0.76	<0.95	<0.40	<0.91	<0.44	<0.83	<0.95	<0.49	0.78	700
Vanadium	41	41	53	34	33	3.2	37	31	55	57	36	67	48	46	55	37	200	2,400
Zinc	37	35	45	40	57	4.4	27	31	57	54	37	48	39	33	45	43	800	5,000

NOTES:

Exceedances Bolded/grey
Sample depths range from 0 to 5 feet
All concentrations in milligrams per kilogram (mg/kg)
ESLs = Environmental Screening Levels California Regional Water Quality Control Board-San Francisco Bay, December 2013
TTLC = Total Threshold Limit Concentrations, California Code of Regulations, Title 22, Division 4.5, Chapter 11, Article 3, Section 66261.24(a)(2)

SOURCE: LASC, 2014

Nearby Hazardous Materials Sites

As discussed above, historical mercury mines have resulted in the release of mercury to the environment and are the subject of the Project. The presence of other facilities within the area that use or store hazardous materials or hazardous wastes and have experienced unauthorized releases into soil or groundwater would complicate the Project if those releases have migrated to the Almaden Lake area.

In California, regulatory databases listing hazardous materials sites provided by numerous federal, state, and local agencies are consolidated in the "Cortese List" pursuant to Government Code Section 65962.5. The Cortese List is located on the website of the California Environmental Protection Agency (Cal EPA; http://www.calepa.ca.gov/sitecleanup/corteselist) and is a compilation of the following lists:

- List of Hazardous Waste and Substances sites from California Department of Toxic Substances Control (DTSC) EnviroStor database
- List of Leaking Underground Storage Tank Sites by County and Fiscal Year from the State Water Resources Control Board (SWRCB) GeoTracker database
- List of solid waste disposal sites identified by SWRCB with waste constituents above hazardous waste levels outside the waste management unit
- List of "active" Cease and Desist Orders and Cleanup and Abatement Orders from the SWRCB
- List of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code, identified by DTSC and listed on their EnviroStor database

The five databases cited above identify sites with suspected and confirmed releases of hazardous materials to soil and/or groundwater. Closed sites are not considered because their status as closed means that they have been cleaned up to the satisfaction of regulatory agencies and are unlikely to affect surrounding areas. The following three sites listed on the Cortese List as located within one mile upstream or upgradient[1] of Almaden Lake, have documented releases, and are active cases[2] or cases recently closed in 2016.

Mazzone Property (No Further Action). This site is located along Alamitos Creek about 2,000 feet upstream and south of Almaden Lake (DTSC, 2016b). Soil and sediments at the Mazzone property were contaminated with mercury, lead, and pesticides. Groundwater is not known to be affected. The site was remediated by the excavation and removal of approximately 3,000 tons of contaminated soil between July and August of 2016. The soil was sent to an offsite disposal facility licensed to accept the material. Soil testing confirmed that the contaminated material has been removed and the DTSC issued a no further removal/remedial action letter.

[1] Similar to upstream, an upgradient location is the source of groundwater to downgradient locations.

[2] An active site is a site that is currently undergoing investigation and/or cleanup activities.

Almaden 16601 LLC (Closed). This ~~currently vacant~~ lot was a previously-closed fuel leak site for a service station located about 3,500 south of Almaden Lake but not along Alamitos Creek. The underground storage tanks had been removed, remediation conducted, and the case closed on October 29, 2004 (County of Santa Clara [CSC], 2015b). ~~This property is proposed as a day care center (CSC, 2016a).~~ The property owners conducted a vapor survey to determine if residual fuels are present in soil at concentrations of concern given the proposed sensitive use (RWQCB, 2016). The results indicated that soil vapors were not present above action levels and the case was closed (CSC, 2016c).

Almaden Quicksilver County Park (Open). The County Park is located about 4 miles upstream of Almaden Lake and is the primary location of the historical mercury mining (DTSC, 2016a). Mercury mining and ore processing were conducted by a number of different entities at the New Almaden mining district from 1845 to 1975. Mercury occurs primarily in the mineral cinnabar (mercury sulfide). Mercury was extracted by heating the ore in retorts and furnaces to volatilize the mercury which was then condensed to liquid mercury. Processed ore (calcines) from the furnaces and retorts was dumped near the processing areas. All mining related operations ceased in 1975 when Santa Clara County purchased the property for use as a park. Five separate areas were investigated as part of this Project. They include areas the Mine Hill area, the Hacienda Furnace Yard, the Enriquita Mine Retort, the San Mateo Mine Retort, and Senator Mine. The mines are the source of mercury to downstream locations such as Almaden Lake.

Proximity to Schools

Schools are considered sensitive receptors for hazardous materials because children are more susceptible than adults to the effects of hazardous materials. There are no schools within ¼ mile of Almaden Lake.

Proximity to Airports

Aviation safety hazards can result if projects are sited on or in the vicinity of airports. Specifically, the land use compatibility plans at airports have land use restrictions, such as height, distracting light or glare, and attractants to wildlife, such as birds. There are no public or private airports located within 2 miles of Almaden Lake. The nearest airports are the public Mineta San José International Airport, located 7.5 miles to the north in San José, Moffet field located 14 miles northwest of the Project site, and the general aviation San Martin Airport, located 18 miles to the southeast in San Martin.

Emergency Response and Evacuation Plans

The Santa Clara County Operational Area Emergency Operations Plan establishes emergency organization, assigns tasks, specifies policies and general procedures, and provides for coordination of response in the event of an emergency (Santa Clara County, 2008). The plan does not identify specific emergency response or evacuation routes.

3.J.2 Regulatory Setting

Hazards and hazardous materials are subject to numerous federal, state, and local laws and regulations intended to protect health, safety, and the environment. The U.S. Environmental Protection Agency (USEPA), the DTSC, the RWQCB, and the County of Santa Clara are the primary agencies enforcing these regulations. Local regulatory agencies enforce many federal and state regulations through the Certified Unified Program Agencies (CUPA) program, discussed further below.

Federal Regulations

Primary federal agencies with responsibility for hazardous materials management include the USEPA, Department of Labor (Federal Occupational Health and Safety Administration [OSHA]), and Department of Transportation (DOT). Major federal laws and issue areas include the following statutes (and regulations promulgated there under):

- Resources Conservation and Recovery Act (RCRA) 42 USC 6901 et seq. RCRA is the principal law governing the management and disposal of hazardous materials. RCRA is considered a "cradle to grave" statute for hazardous wastes in that it addresses all aspects of hazardous materials from creation to disposal. Federal regulations for USTs derive from RCRA. RCRA applies to this Project because RCRA is used to define hazardous materials.

- Emergency Planning and Community Right-to-Know Act (EPCRA from SARA Title III). EPCRA improved community access to information regarding chemical hazards and facilitated the development of business chemical inventories and emergency response plans. EPCRA also established reporting obligations for facilities that store or manage specified chemicals. EPCRA applies to this Project because contractors will be required to prepare and implement written emergency response plans to properly manage hazardous materials during construction and respond to accidental spills.

- DOT Hazardous Materials Transportation Act (49 USC 5101). DOT, in conjunction with the USEPA, is responsible for enforcement and implementation of federal laws and regulations pertaining to safe storage and transportation of hazardous materials. The Code of Federal Regulations (CFR) 49, 171–180, regulates the transportation of hazardous materials, types of material defined as hazardous, and the marking of vehicles transporting hazardous materials. This Act applies to this Project because contractors will be required to comply with its storage and transportation requirements that would reduce the possibility of spills.

- The Federal Motor Carrier Safety Administration (49 CFR Part 382). The Federal Motor Carrier Safety Administration, a part of the DOT, issues regulations concerning highway routing of hazardous materials, the hazardous materials endorsement for a commercial driver's license, highway hazardous material safety permits, and financial responsibility requirements for motor carriers of hazardous materials. This Act applies to this Project because contractors will be required to comply with its storage and transportation requirements that would reduce the possibility of spills.

- Occupational Safety and Health Administration (OSHA; 29 USC 15). OSHA is the federal agency responsible for ensuring worker safety. These regulations provide standards for safe workplaces and work practices, including those relating to hazardous

materials handling. OSHA applies to this Project because contractors will be required to comply with its hazardous materials management and handling requirements that would reduce the possibility of spills.

- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. §136 et seq. (1996). FIFRA provides for federal regulation of pesticide distribution, sale, and use ("pesticides" includes any herbicide, insecticide, rodenticide, algaecide, fungicide, or any combination of substances intended to prevent, destroy, or repel any pest). All pesticides distributed or sold in the United States must be registered (licensed) by the US EPA. Before US EPA may register a pesticide under FIFRA, the applicant must show, among other things, that using the pesticide according to specifications "will not generally cause unreasonable adverse effects on the environment." FIFRA defines the term "unreasonable adverse effects on the environment" to mean: "(1) any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide, or (2) a human dietary risk from residues that result from a use of a pesticide in or on any food inconsistent with the standard under section 408 of the Federal Food, Drug, and Cosmetic Act." Training is required for workers in pesticide-treated areas and certification and training for applicators of restricted use pesticides.

State Regulations

The primary State agencies with jurisdiction over hazardous chemical materials management are the DTSC and the RWQCB. Other State agencies involved in hazardous materials management are the Department of Industrial Relations (State OSHA implementation), State Office of Emergency Services (OES)—CalARP implementation, California Air Resources Board (CARB), California Department of Transportation (Caltrans), State Office of Environmental Health Hazard Assessment (OEHHA—Proposition 65 implementation) and California Integrated Waste Management Board (CIWMB). Hazardous materials management laws in California include the following statutes and regulations promulgated there under.

- Hazardous Waste Control Act (HWCA; California Health and Safety Code, Section 25100 et seq.). The HWCA is the state equivalent of RCRA and regulates the generation, treatment, storage, and disposal of hazardous waste. This act implements the RCRA "cradle-to-grave" waste management system in California but is more stringent in its regulation of non-RCRA wastes, spent lubricating oil, small-quantity generators, transportation and permitting requirements, as well as in its penalties for violations. HWCA applies to this Project because contractors will be required to comply with its hazardous waste requirements that would reduce the possibility of spills.

- California Hazardous Materials Release Response Plans and Inventory Law of 1985 (Business Plan Act). The Business Plan Act requires preparation of Hazardous Materials Business Plans and disclosure of hazardous materials inventories, including an inventory of hazardous materials handled, plans showing where hazardous materials are stored, an emergency response plan, and provisions for employee training in safety and emergency response procedures (California Health and Safety Code, Division 20, Chapter 6.95, Article 1). Under the Health and Safety Code, in order to protect the public health and safety and the environment, it is necessary to establish business and area plans relating to the handling and release or threatened release of hazardous materials. Basic information on the location, type, quantity, and health risks of hazardous materials

handled, used, stored, or disposed of in the state, which could be accidentally released into the environment, is required to be submitted to firefighters, health officials, planners, public safety officers, health care providers, regulatory agencies, and other interested persons. The information provided by business and area plans is necessary in order to prevent or mitigate the damage to the health and safety of persons and the environment from the release or threatened release of hazardous materials into the workplace and environment. Statewide, DTSC has primary regulatory responsibility for management of hazardous materials, with delegation of authority to local jurisdictions that enter into agreements with the state. Local agencies are responsible for administering these regulations.

Several state agencies regulate the transportation and use of hazardous materials to minimize potential risks to public health and safety, including CalEPA and the California Emergency Management Agency. The California Highway Patrol and Caltrans enforce regulations specifically related to the transport of hazardous materials. Together, these agencies determine container types used and license hazardous waste haulers for hazardous waste transportation on public roadways.

The Business Plan Act applies to this Project because contractors will be required to comply with its handling, storage, and transportation requirements that would reduce the possibility of spills, and to prepare an emergency response plan to respond to accidental spills.

- California Division of Occupational Safety and Health (Cal/OSHA). Cal/OSHA is responsible for developing and enforcing workplace safety standards and assuring worker safety in the handling and use of hazardous materials. Among other requirements, Cal/OSHA requires many entities to prepare injury and illness prevention plans and chemical hygiene plans, and provides specific regulations to limit exposure of construction workers to hazardous materials. OSHA applies to this Project because contractors will be required to comply with its handling and use requirements that would reduce the possibility of spills, and to prepare an emergency response plan to respond to accidental spills.

- California Department of Pesticide Regulation (DPR), 3 CCR Food and Agriculture, Division 6. Pesticides and Pest Control Operations. This section of the CCR addresses the use of pesticides and pest control operations (“pesticides” includes any herbicide, insecticide, rodenticide, algaecide, fungicide, or any combination of substances intended to prevent, destroy, or repel any pest). These regulations provide pesticide registration and licensing procedures, lists of restricted materials, work and worker safety requirements, and environmental protections for groundwater, surface water, air, and aquatic environments. The District and its contractors will be required to comply with DPR regulations.

Local Regulations

Basin Plan and TMDL

In October 2008, the Regional Water Quality Control Board (RWQCB adopted a TMDL for mercury in the Guadalupe River Watershed in its San Francisco Bay Basin Water Quality Control Plan (RWQCB, 2008). TMDLs are actions required by the RWQCB to restore clean water. Section 303(d) of the federal Clean Water Act requires that states identify water bodies that do not meet water quality standards. TMDLs are established to examine these

water quality problems, identify sources of pollutants, and specify actions to address the water quality issues.

TMDLs define how much of a pollutant a water body can tolerate and meet water quality standards. TMDLs account for all the sources of a pollutant, including discharges from wastewater treatment facilities; runoff from homes, agriculture, and streets or highways; "toxic hot spots;" and deposits from the air. In addition to accounting for past and current activities, TMDLs may consider projected growth that could increase pollutant levels.

The TMDL for Alamitos Creek is 0.2 milligrams of mercury per kilogram suspended sediment (dry weight). The TMDL for Almaden Lake is 1.5 nanograms total methylmercury per liter water (seasonal maximum, hypolimnion[3]). In addition, the Basin Plan established a load and wasteload allocation for methylmercury production in Almaden Lake of 1.5 nanograms total methylmercury per liter of water (seasonal maximum, hypolimnion). The Basin Plan and the TMDL apply to this Project because they are the regulatory drivers requiring site remediation.

Certified Unified Program Agency

In 1993, Senate Bill (SB) 1082 was passed by the State Legislature to streamline the permitting process for those businesses that use, store, or manufacture hazardous materials. The passage of SB 1082 provided for the designation of a CUPA that would be responsible for the permitting process and collection of fees. The CUPA would be responsible for implementing at the local level the Unified Program, which serves to consolidate, coordinate, and make consistent the administrative requirements, permits, inspections, and enforcement activities for the following environmental and emergency management programs:

- Hazardous Materials Release Response Plans and Inventories (Hazardous Materials Business Plans)
- California Accidental Release Prevention (CalARP) Program
- Underground Storage Tank Program
- Aboveground Petroleum Storage Act Requirements for Spill Prevention, Control and Countermeasure (SPCC) Plans
- Hazardous Waste Generator and On-Site Hazardous Waste Treatment (tiered permitting) Programs
- California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements

For Santa Clara County and the City of San José, the Department of Environmental Health (DEH) administers hazardous materials business plans, hazardous waste, tiered permits, CalARP, and underground and above ground storage tanks (Unidocs, 2018). The San José Fire Department administers the California Fire Code, hazardous materials storage, and

[3] The lower layer of water in a stratified lake, typically cooler than the water above and relatively stagnant.

toxic gases. Contractors will be required to comply with the regulatory programs overseen by the CUPA.

Control and Oversight of Pesticide Use (District Document Q751D02)

The District established policies and procedures for pesticide approval, purchasing, acquisition, handling, use, storage, transportation, disposal, and reporting in a manner consistent with all Districts' permits, the California Environmental Quality Act (CEQA), and the California DPR (SCVWD, 2017). These policies and procedures do not replace the need for regulatory permits and only apply to District work activities once these permits are in place.

These policies and procedures apply to all District-owned or operated facilities and staff, contractors, permittees, and suppliers. The District goal is to minimize the environmental risk and exposure resulting from its pesticide use by employing Best Management Practices (BMPs) and alternatives to their use to the maximum extent practicable and to facilitate the safe use of pesticide by qualified staff and contractors. Contractors will be required to comply with the regulatory programs overseen by the District.

City of San José General Plan

A General Plan is a basic planning document that, alongside the zoning code, governs development in a city or county. The state requires each city and county to adopt a General Plan with seven mandatory elements: land use, open space, circulation, housing, noise, conservation, and safety, along with any number of optional elements as appropriate. The Project would be subject to local plans and policies of the areas in which they are located. The City of San José General Plan includes the following policy related to hazards and hazardous materials:

> Policy MS-6.5: Reduce the amount of waste disposed in landfills through waste prevention, reuse, and recycling of materials at venues, facilities, and special events.
>
> Policy MS-8.7: Manage wastes locally to the greatest extent feasible to minimize the export of wastes and pollution to our and other communities.
>
> Policy MS-20.4: Work with local, regional and state agencies to protect and enhance the watershed, including the protection of surface water and ground water supplies from pollution and degradation.
>
> Policy ER-8.1: Manage stormwater runoff in compliance with the City's Post-Construction Urban Runoff (6-29) and Hydromodification Management (8-14) Policies.
>
> Policy EC-6.1: Require all users and producers of hazardous materials and wastes to clearly identify and inventory the hazardous materials that they store, use or transport in conformance with local, state and federal laws, regulations and guidelines.
>
> Policy EC-6.2: Require proper storage and use of hazardous materials and wastes to prevent leakage, potential explosions, fires, or the escape of harmful gases, and to prevent individually innocuous materials from combining to form hazardous substances, especially at the time of disposal by businesses and residences. Require proper disposal of hazardous materials and wastes at licensed facilities.

Policy EC 6.10: Promote source reduction and recycling as alternatives to hazardous materials land disposal whenever feasible.

Policy EC-7.9: Ensure coordination with the County of Santa Clara Department of Environmental Health, Regional Water Quality Control Board, Department of Toxic Substances Control or other applicable regulatory agencies, as appropriate, on projects with contaminated soil and/or groundwater or where historical or active regulatory oversight exists.

Policy EC-7.10: Require review and approval of grading, erosion control and dust control plans prior to issuance of a grading permit by the Director of Public Works on sites with known soil contamination. Construction operations shall be conducted to limit the creation and dispersion of dust and sediment runoff.

3.J.3 Impacts and Mitigation Measures

The Project's impacts were assessed using the CEQA Guidelines Appendix G Checklist. The following sections discuss the key issue areas identified in the CEQA Guidelines with respect to the Project's hazard and hazardous material impacts.

Significance Criteria

Implementation of the Project would have a significant impact relative to hazards or hazardous materials if it were to:

- Create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of hazardous materials during the use of equipment.
- Create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of contaminated soil during construction.
- Create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of pesticides during operations.
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment.
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area.
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

Approach to Analysis

Avoidance and Minimization Measures Incorporated into the Project

Avoidance and minimization measures are those parameters that have been built into the design of the Project and are committed to as part of Project implementation. These measures are included in Chapter 2, Project Description, Section 2.E.1.

The following avoidance and minimization measures are contained in the District's Best Management Practices (BMP) Handbook (SCVWD, 2014), and have been incorporated into the Project. These measures would generally help to reduce the intensity of impacts associated with the Project, in accordance with District policy. Note that the District uses the term "pesticides" to refer to any herbicide, insecticide, rodenticide, algaecide, fungicide, or any combination of substances intended to prevent, destroy, or repel any pest. The BMPs draw from and refer to the District's Document Q751D02, Control and Oversight of Pesticide Use, discussed above in the Regulatory Setting.

HM-1. Comply with All Pesticide Application Restrictions and Policies.

HM-2. Minimize Use of Pesticides.

HM-3. Post Areas Where Pesticides will be Used.

HM-4. Comply with All Pesticide Usage Requirements.

HM-5. Comply with Restrictions on Herbicide Use in Upland Areas.

HM-6. Comply with Restrictions on Herbicide Use in Aquatic Areas.

HM-7: Restrict Vehicle and Equipment Cleaning to Appropriate Locations.

HM-8. Ensure Proper Vehicle and Equipment Fueling and Maintenance.

HM-9. Ensure Proper Hazardous Materials Management.

HM-11. Ensure Worker Safety in Areas with High Mercury Levels.

No Impact Significance Determinations

Based on the nature of the Project, there would be no impact related to the following criterion:

Be located within ¼ mile of a school. There are no schools within ¼ mile of the project area and no impact would occur (see Sections 3.J.1, Environmental Setting, Proximity to Schools).

Be located within 2 miles of an airport. There are no airports within 2 miles of the project area and no impact would occur (see Sections 3.J.1, Environmental Setting, Proximity to Airports).

Impact Summary

Table 3.J-3 provides a summary of hazards and hazardous materials impacts by implementation phase (construction and operations). Table 3.J-3 provides a summary of applicable mitigation measures by implementation phase.

TABLE 3.J-3
SUMMARY OF HAZARDS AND HAZARDOUS MATERIALS IMPACTS

Impact Statement	Construction	Operation
Impact 3.J-1: The Project would not create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of hazardous materials during the use of equipment.	LS	LS
Impact 3.J-2: The Project would not create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of contaminated soil.	LS	LS
Impact 3.J-3: The Project would not create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of pesticide.	NI	LS
Impact 3.J-4: The Project would be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 or other listings, but would not create a significant hazard to the public or the environment.	LS	LS
Impact 3.J-5: The Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LS	LS

NI = No impact
LS = Less than significant
LSM = Less than significant with mitigation

Impacts and Mitigation Measures

Impact 3.J-1: The Project would not create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of hazardous materials during the use of equipment. (Less than Significant)

Construction and Operations Impacts

Construction of the Project would require the use of earth moving equipment, vehicles, and other fuel-powered equipment. Project operations would require the use of vehicles and equipment. Petroleum products, such as gasoline, diesel fuel, lubricants, and cleaning solvents would be utilized to fuel and maintain construction vehicles and equipment. The routine use or reasonably foreseeable upset and accident conditions could result in the release of small quantities of hazardous materials, which could adversely affect the public or the environment.

Construction and operations activities would be required to comply with numerous hazardous materials and stormwater regulations designed to ensure that hazardous materials would be transported, used, stored, and disposed of in a safe manner to protect worker safety, and to reduce the potential for a release of construction-related fuels or other hazardous materials to the environment (see Section 3.J.2, Regulatory Setting). The Hazardous Materials Business Plan required by the Business Plan Act would require that hazardous materials used for construction be stored in appropriate containers, with secondary containment to contain a potential release. The California Fire Code would require measures for the safe storage and handling of hazardous materials. As discussed in Section 3.K, Hydrology and Water Quality, construction contractors would be required to prepare a Stormwater Pollution Prevention Plan (SWPPP) for construction activities according to the National Pollutant

Discharge Elimination System (NPDES) Construction General Permit requirements. The SWPPP would list the hazardous materials (including petroleum products) proposed for use during construction and describe spill prevention measures, equipment inspections, equipment and fuel storage, and protocols for responding immediately to spills.

As discussed in Chapter 2, Project Description, the District has incorporated Avoidance and Minimization Measures into the Project, provided in the District's BMP Handbook. The measures relevant to hazardous materials are listed above in the section titled *Avoidance and Minimization Measures Incorporated into the Project*, and include District BMPs HM-5 through HM-9, and HM-11. The listed specific measures minimize the impact of hazardous materials releases by ensuring that herbicide use is restricted, limiting the use of hazardous materials for the maintenance and cleaning of vehicles and equipment to appropriate areas, ensuring the proper management of hazardous materials, and protecting workers from elevated mercury concentrations.

Therefore, compliance with existing regulations and implementation of the Avoidance and Minimization Measures would ensure that the Project would not create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of hazardous materials, resulting in a less than significant impact. No mitigation measures would be required.

Mitigation Measures

None required.

Impact 3.J-2: The Project would not create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of contaminated soil. (Less than Significant)

Construction Impacts

As described in Chapter 2, Project Description, the Project would rework the bottom of the lake to eliminate pits from the historical quarry. The lake bottom would then be capped with imported clay fill material, sealing sediments contaminated with mercury at the bottom of the lake and preventing its entry into the food chain. As discussed above in the Environmental Setting, the analytical results for mercury in some samples exceeded the TTLC for mercury, indicating that if these sediments are excavated and sent for offsite disposal, the sediments would have to be sent to a Class I landfill permitted to accept hazardous waste. The District anticipates that cut volumes classified as hazardous waste would be sent for offsite disposal at a landfill permitted to accept Class I hazardous waste in Kettleman, CA or Utah.

The sediment management activities proposed under the Project would be required to comply with various hazardous materials regulations designed to ensure that hazardous waste, including contaminated sediment, would be excavated, transported, and disposed of in a safe manner to protect worker safety, and to reduce the potential for a release of

hazardous materials to the environment (see Section 3.J.2, Regulatory Setting). Cal-OSHA would require that construction workers be trained to properly handle hazardous waste. RCRA and HWCA would regulate the management and disposal of hazardous waste. The DOT Hazardous Materials Transportation Act and the Federal Motor Carrier Safety Administration would regulate the transportation of hazardous waste.

In addition, and as discussed in Chapter 2, Project Description, the District has incorporated Avoidance and Minimization Measures into the Project, provided in the District's BMP Handbook. The measures relevant to hazardous materials are listed above in the section titled Avoidance and Minimization Measures Incorporated into the Project, and include District BMPs HM-9 and HM-11. District BMP HM-9, Ensure Proper Hazardous Materials Management, would include worker training, minimizing chemical contact with precipitation, ensuring hazardous materials will not contact soil or be allowed to enter surface waters or the storm drainage system, and covering hazardous waste disposal containers when not in use. District BMP HM-11, Ensure Worker Safety in Areas with High Mercury Levels, would ensure worker safety is protected in areas with elevated mercury concentrations in exposed surfaces by requiring personal protective equipment during project construction to maintain exposure below levels established by Cal/OSHA. The listed specific measures would minimize the impact of hazardous materials releases by ensuring safe containment and handling to prevent accidental release or exposure, providing appropriate worker training, and requiring personal protective equipment during project construction.

The anticipated volumes of cut materials would be up to approximately 25,000 cubic yards. The process of reshaping the lake bottom, removing some of the contaminated sediments, and transporting the contaminated sediments could expose workers or the environment to contaminated sediments during construction. Compliance with relevant hazardous materials regulations and the implementation of District BMPs would reduce exposure of workers and the environment to mercury laden sediments, as summarized below.

To comply with regulations and the District's Avoidance and Minimization Measures (BMPs HM-9 and HM-11), and as required under OSHA and 29 CFR 1910.120, the District and/or its contractor(s) would be required to prepare and implement a site-specific Health and Safety Plan to protect construction workers and the public during all excavation, grading, soil management, and disposal activities. This plan(s) would be submitted to the District for review prior to commencement of construction. The Health and Safety Plan would include, but is not limited to, the following elements:

- Designation of a trained, experienced site safety and health supervisor who has the responsibility and authority to develop and implement the site Health and Safety Plan
- A summary of all potential risks to construction workers and maximum exposure limits for all known and reasonably foreseeable site chemicals
- Specified personal protective equipment and decontamination procedures, if needed
- Emergency procedures, including route to the nearest hospital

- Procedures to be followed in the event that evidence of potential soil or sediment contamination (such as soil staining, noxious odors, debris or buried storage containers) is encountered. These procedures shall be in accordance with hazardous waste operations regulations and specifically include, but are not limited to, the following: immediately stopping work in the vicinity of the unknown hazardous materials release, notifying the District, and retaining a qualified environmental firm to perform sampling and remediation.

To comply with regulations and the District's Avoidance and Minimization Measures (BMPs HM-9 and HM-11), and as required by RCRA (the chemical concentrations exceed hazardous waste criteria), the District would require its contractor to develop and implement a site-specific Soil Management Plan that would include, but not be limited to, the following elements:

- Contract specifications mandating full compliance with all applicable local, state, and federal regulations related to the identification, transportation, and disposal of hazardous materials, including those encountered in excavated sediment.
- Identification of the lateral extent and depth of the materials to be removed
- Protocols for the laboratory analytical testing of soil for waste profiling (required by waste disposal facilities as part of their waste acceptance criteria)
- Identification of the licensed disposal facility permitted to accept the waste, including written documentation that the disposal facility will accept the waste
- Submittal of this plan to the District for review prior to commencement of construction.

Compliance with regulations and the District's Avoidance and Minimization Measures described above would ensure safe containment and handling to prevent accidental release or exposure, require personal protective equipment for workers during Project construction, develop and implement a Health and Safety Plan and a Soil Management Plan, and provide appropriate worker training. This impact is considered less than significant.

Operations Impacts

Upon completion of the Project, the sediment at the bottom of the lake that contains mercury would be sealed under a clay fill material cap. The public and the environment would no longer be exposed to those sediments. The Almaden Valley Pipeline would provide imported water as a water source for water management in Almaden Lake. The imported water quality would generally be better than creek water with less mercury being reintroduced to Almaden Lake (SCVWD, 2018). Water quality and occasional sediment removal in the lake would be carefully managed as discussed in Section 3.K, Hydrology and Water Quality. This impact is considered less than significant.

Future maintenance may include bank stabilization efforts as needed and sediment removal periodically downstream of the Lake as currently occurs under the Stream Maintenance Program~~, which may occur every ten years~~. The restored Alamitos Creek channel would receive mercury from upstream sources. Future maintenance work would incorporate regulatory requirement and Avoidance and Minimization Measures such as BMPs HM-9 and

HM-11 as discussed above. With implementation of these measures, hazards to the public and the environment through the transport, use, disposal, or release of contaminated soil would be less than significant.

Mitigation Measures

None required.

Impact 3.J-3: The Project would not create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of pesticides during operations. (Less than Significant)

Construction Impacts

Pesticides would not be used during construction activities; therefore, no impact would occur.

Operations Impacts

Upon completion of Project construction, the District would manage vegetation growth on the top of the levee and invasive plants on the island with pesticides. The inappropriate use of pesticides could result in adverse effects to the workers and the environment. Herbicides currently used by the District include Glyphosate, Imazapyr, Isoxaben, Triclopyr, Clopyralid, and Aminopyralid depending on the vegetation control need. Live trapping is conducted for rodent control at levees if needed; rodenticides are not used by the District.

The use of pesticides would be required to comply with pesticide regulations designed to ensure that the pesticides would be applied in a safe manner to protect the safety of the workers and the public, and in a manner appropriate for the environment. The use of pesticides, and worker and environmental safety are specifically regulated at the federal level (FIFRA) and state level (DPR and 3 CCR Food and Agriculture, Division 6. Pesticides and Pest Control Operations). At the local level, the District regulates its use of pesticides through District Document Q751D02, Control and Oversight of Pesticide Use. In addition, Cal-OSHA would require that workers applying the pesticides be trained to properly handle and apply the pesticides. RCRA, HWCA, and the Business Plan Act would regulate the use, storage, and transportation of hazardous materials, including pesticides.

As discussed in Chapter 2, Project Description, the District has incorporated Avoidance and Minimization Measures into the Project, provided in the District's BMP Handbook. The measures relevant to hazardous materials are listed above in the section titled Avoidance and Minimization Measures Incorporated into the Project, and include District BMPs HM-1 through HM-6, and HM-9. These measures are consistent with the above-listed federal, state, and local regulations. The listed specific measures would further reduce the potential for and minimize the impact of hazardous materials releases through restrictions on upland pesticide application within 72 hours of predicted significant rainfall, utilizing only pesticides

registered for aquatic use in aquatic areas, seasonal limitations on aquatic pesticide use, ensuring proper handling of pesticides and protecting the quality of water resources by all reasonable means (as specified in District BMP HM-9).

Therefore, with compliance of existing regulations and implementation of the Avoidance and Minimization Measures, the impacts related to the use of pesticides is less than significant. No mitigation measures would be required.

Mitigation Measures

None required.

Impact 3.J-4: The Project is located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 or other listings, but would not create a significant hazard to the public or the environment. (Less than Significant)

Construction and Operations Impacts

As discussed above in the Environmental Setting, Almaden Lake, along with the Guadalupe River Watershed, is listed by Santa Clara County and the RWQCB for mercury contamination. Santa Clara County issued a fish consumption advisory and the RWQCB has established a TMDL for the entire watershed. The current configuration of the lake and creek continues to result in the generation of methylmercury that enters the creek waters and the food chain, which adversely affects the environment.

The purpose of the Project is to address the mercury contamination and eliminate Almaden Lake as a source of methylmercury in the environment. With the completion of the Project, the mercury-containing sediments would be either sealed beneath a clay cap at the bottom of the lake or transported to an offsite disposal facility permitted to accept the waste. The District would maintain the levees separating the lake from the creek, thus protecting the cap that seals the bottom of the lake and preventing mercury from entering the environment. Water within the restored creek would continue to include mercury, as occurs under current conditions. Therefore, implementation and completion of the Project would not result in a significant hazard to the public, and the impact would be less than significant. No mitigation measures would be required.

Mitigation Measures

None required.

Impact 3.J-5: The Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. (Less than Significant)

Construction Impacts

Construction of the Project would require the use of earth moving equipment, trucks for equipment and the movement of soil, and vehicles for the transport of workers. The vast majority of Project construction activities would not be located on public roads but would require construction access and haul routes using public roads, including Winfield Boulevard, Almaden Expressway, and Coleman Road. The use of public roads could impair or physically interfere with emergency response actions, which could adversely affect the public.

While construction would occur along McAbee Road ~~Crossview Drive~~ and could occur along Almaden Expressway, closures would be limited to one lane at a time, and therefore would not interfere with emergency vehicle movement. No other construction activities would occur on public roads. Therefore, there would be no road closures that could affect emergency actions using public roads. Although construction vehicles would use public roads to and from the Project site, no complete road closures would occur as a result of their use. The three adjacent roads that would experience use by construction vehicles: Winfield Boulevard, Almaden Expressway, and Coleman Road, all have at least two lanes in each direction. Construction vehicles would have room to pull over and let emergency vehicles pass, and emergency vehicles would have room to go around construction vehicles. Therefore, the roads would have sufficient space for emergency vehicles and the impact would be less than significant.

Operations Impacts

Upon completion of the Project, the District would manage the levee and vegetation growth. The number of District vehicles entering and exiting the Project site would not substantially increase in comparison to existing conditions. For additional discussion of traffic-related impacts during operation, refer to Section 3.P, Transportation. All relevant roads would have sufficient space for emergency vehicles and the impact would be less than significant. No mitigation measures would be required.

Mitigation Measures

None required.

3.J.4 References

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3.K Hydrology and Water Quality

This section describes the environmental and regulatory setting of the Project area with respect to surface and groundwater hydrology and water quality conditions that could be affected by construction, operation, and maintenance of the Project. District best management practices (BMPs) and mitigation measures to reduce significant impacts are also identified, as necessary.

3.K.1 Environmental Setting

Regional Setting

The Project is located within the Guadalupe River Watershed, which extends from the headwaters in the eastern Santa Cruz Mountains near the summit of Loma Prieta in unincorporated Santa Clara County, to the discharge point of the Guadalupe River at Alviso Slough where waters continue to flow into the Lower South San Francisco Bay. The Guadalupe River begins on the valley floor at the confluence of Alamitos Creek and Guadalupe Creek. The watershed drains approximately 171 square miles and includes portions of unincorporated Santa Clara County, and the towns and cities of Los Gatos, San José, Santa Clara, Monte Sereno, and Campbell. The upper watershed is heavily forested with pockets of residential development, with urban development increasing in density on the valley floor.

Groundwater

The Santa Clara Valley Basin extends from southern San José north into Alameda and San Mateo Counties. It is in a structural trough that is bounded by the Santa Cruz Mountains to the west and the Diablo Range to the east. It is divided into four subbasins, with the Santa Clara Subbasin underlying the Guadalupe River Watershed. The Santa Clara Subbasin is approximately 22 miles long and ranges from about 15 miles wide in the north to about 0.05 mile in the south where two mountain ranges converge. The Santa Clara Subbasin extends from the southern edge of the San Francisco Bay southward to the groundwater divide near Morgan Hill. Groundwater in the Santa Clara Subbasin generally flows in the direction of ground surface topography, towards the Subbasin interior and northerly towards the San Francisco Bay (SCVWD, 2010). The Subbasin is subdivided into two management areas – the Santa Clara Plain and the Coyote Valley Recharge Area. The Santa Clara Plain is further divided into confined and recharge areas; the confined area underlies the valley floor in the northern and central portions of the Subbasin, and the recharge areas underlie higher elevation, alluvial fan areas along the edges of the Subbasin (SCVWD, 2012). Sources of recharge include deep percolation of precipitation, leakage from streams, subsurface inflow from surrounding hills, and recharge operations managed by the District (SCVWD, 2010).

Climate

The Project region has a Mediterranean climate, with warm dry summers and mild wet winters. Average annual precipitation is approximately 16 inches, with the majority of the rain occurring in the winter months. December is generally the coolest month with an average of 51.1 degrees Fahrenheit (F), while July is the warmest month with an average of 69.9 degrees F (NOAA, 2016a). December is generally the wettest month with an average of 2.81 inches of rainfall, while July and August are the driest months with an average of 0.00 inches of rainfall (NOAA, 2019).

Project Hydrologic Setting

Almaden Lake Watershed

Almaden Lake is located at the downstream end of the seven mile long Alamitos Creek and its tributaries, including Calero Creek, which receives flow from Almaden and Calero Reservoirs. Alamitos Creek flows into the lake and joins Guadalupe Creek, which receives flows from Guadalupe Reservoir, just downstream of the lake to form the main stem of the Guadalupe River. Guadalupe River flows north through the City of San José and empties into the South San Francisco Bay at Alviso Slough.

Both Almaden and Calero Reservoirs are managed by the District. Almaden Reservoir captures rainfall runoff from a 12 square mile watershed and Calero Reservoir captures rainfall runoff and receives imported water (including from Almaden Reservoir). Both reservoirs provide water used for groundwater recharge. Almaden and Guadalupe Reservoirs are impacted by mercury mining operations that began in the 1840s and ended in the 1970s. Calero Reservoir receives water transferred from Almaden Reservoir, and as a result it is secondarily elevated in mercury; the watershed draining to Calero is not itself high in mercury (SCVWD, 2015; 2016a).

The District operates the Alamitos Flashboard Dam in the Guadalupe River adjacent to the ~~Los~~ Alamitos Percolation Pond. The flashboard dam allows the District to divert water to the percolation Pond, and when installed, increases the elevation of Almaden Lake.

Almaden Lake

Almaden Lake was formed as a result of inundation of a gravel-mining pit adjacent to Alamitos Creek when the levee separating the creek and the quarry breached circa 1960. Almaden Lake is currently replenished by Alamitos Creek flows, direct precipitation, and limited stormwater runoff from adjacent areas. Almaden Lake is approximately 32 acres in area, with a maximum depth of 43 feet (SCVWD, 2015). The elevation of the lake surface is raised approximately 5 feet when flashboards are installed at the Alamitos Flashboard Dam downstream. Water flowing from Almaden Lake into the Guadalupe River is primarily surface water, which is warmer than lake bottom temperatures during the summer months.

Groundwater

Almaden Lake and its watershed are situated at the southern boundary of the Santa Clara Plain Recharge Area, which includes alluvial fan and fluvial deposits where high lateral and vertical permeability allow surface water to infiltrate into the aquifers. Percolation into the recharge areas replenishes the unconfined portions of the recharge area and deep aquifers in the confined area via subsurface flow. To assist with natural infiltration, the District manages the Guadalupe Recharge System (and others) such that water released from Almaden, Guadalupe, and Calero Reservoirs provides in-stream recharge and can be diverted to the Alamitos and Guadalupe groundwater percolation ponds (SCVWD, 2012). Almaden Lake (a former quarry) is not a groundwater recharge location because the lake bottom is not conducive to recharge, and is not a part of District operations.

Current groundwater level measurements were not available within the Project site, but are available in the general vicinity of the Project. Based on data maintained by the California Department of Water Resources (DWR, 2019), groundwater levels in the Project vicinity range from approximately 5 to 66 feet below ground surface (bgs), based on groundwater monitoring wells located up to approximately one mile from the Project site, including at Pioneer High School (0.4 mi northwest of the Project site), at the intersection of Lionsville Lane and Sunflower Lane (0.7 mi west of the Project site), and at the intersection of Callahan Avenue and Coffey Court (1.1 mi east of the Project site). The shallowest groundwater levels were at the Pioneer High School monitoring well, at a ground surface elevation approximately 15 feet higher than the Almaden Lake surface, where groundwater depths ranged from 5.5 to 44 feet bgs. The shallowest groundwater levels observed at the other two sites were 16 and 12 feet, in April, 2017. Considering these levels, and the existing water levels of Almaden Lake, it is anticipated that shallow groundwater is likely to occur within the Project area. This is consistent with prior District estimates for the Project area, which indicate that the depth to shallow aquifer is 5 to 15 feet bgs, while the depth to the principal aquifer is 100 feet bgs or less (SCVWD, 2010).

Flooding

The Federal Emergency Management Agency (FEMA) delineates regional flooding hazard areas in Santa Clara County as part of the National Flood Insurance Program. The FEMA 100-year flood hazard zone (i.e., areas that, statistically, have a 1 percent chance of flooding in any given year) in the Project vicinity is shown in Figure 3.K-1. The entire Almaden Lake area, portions of the shoreline on the north, west, and east sides of Almaden Lake, the riparian area and shoreline at the Alamitos Creek inlet, the Alamitos Creek outlet, and Guadalupe River and its shorelines are within the 100-year flood hazard zone.

Modifications to control flooding in the Alamitos Creek Watershed have occurred since about 1866, which affect sediment transport and locations where mercury-laden sediment accumulates (RWQCB – San Francisco Bay, 2006). In the late 1970s, levees were built along Alamitos Creek from the Harry Road bridge to the confluence with Almaden Lake. Stream maintenance measures in the vicinity of the Project have included the routine removal of sediment from the drop structures and flood control structures in various parts of the Guadalupe River Watershed, and bank protection projects to prevent erosion.



SOURCE: FEMA, 2014

Almaden Lake Improvement Project . 130679

Figure 3.K-1 (Revised)
100-Year Flood Zone in the Project Vicinity

Dam or Levee Failures

Dam failure can occur as a result of overtopping caused by floods that exceed dam capacity; deliberate acts of sabotage; structural failure; foundational movement; materials settlement or cracking; piping and internal erosion; and inadequate maintenance and upkeep of a dam (Santa Clara County, 2011). Dams located upstream of the Project include Calero Dam on the Calero Reservoir, Almaden Dam on the Almaden Reservoir, and Guadalupe Dam on the Guadalupe Reservoir. All three dams are regulated by the design and operational requirements established by the California Division of Safety of Dams (DSOD) and are administered by the District. These requirements limit the amount of water that can be held below dam capacity until seismic issues are addressed at each dam. These operational constraints minimize the risk of flooding associated from dam failure, under existing conditions.

California Water Code Section 6000, et seq. and Title 23 of the California Code of Regulations (CCR) § 301, et seq. establish the authority and responsibility of the DSOD, including periodic safety inspection of dams, completion of studies that predict the flood zones created by sudden dam failure, including a program for emergency warning and evacuation prepared by the District. The DSOD requires the determination of a dam inundation area and submission of dam inundation maps, which show the areas downstream of a dam that would be inundated or impacted by the failure of the dam and floodwaters. The Project Area is at risk of inundation due to dam failure of Almaden Dam and/or Calero Dam (Santa Clara County, 1973; SCVWD, 2014).

There are no levees on the Project site. The only flood control levees located in the vicinity of the Project site separate the Guadalupe River from the ~~Los~~ Alamitos Percolation Pond, immediately north of the Project area, and along Alamitos Creek from the Harry Road bridge to the confluence with Almaden Lake, as described previously.

Tsunamis and Seiche

A tsunami is a sea wave of local or distant origin that results from large-scale seafloor displacements associated with large earthquakes, major submarine slides, or exploding volcanic islands (USGS, 2016). In 2009, the California Geological Survey, California Emergency Management Agency (CalEMA), and the Tsunami Research Center at the University of Southern California completed the State's official tsunami inundation maps. Based on this mapping, the Project site is located outside of potential tsunami inundation (CalEMA et al., 2009).

A seiche is caused by oscillation of the surface of a large enclosed or semi-enclosed body of water such as the San Francisco Bay due to an earthquake or large wind event. Seiches can result in long-period waves that cause run-up or overtopping of adjacent landmasses, similar to tsunami runup. Almaden Lake is sufficiently sized that a seiche has the potential to occur in the event of an earthquake.

Almaden Lake Water Quality

District's Existing Water Quality Monitoring Project

As a result of the 2008 adoption of the Mercury Total Maximum Daily Load (TMDL) in the Guadalupe River Watershed, the District is required to produce biennial progress reports that describe the water quality results and the efficacy of methods implemented to reduce methylmercury concentrations in Guadalupe Reservoir, Almaden Reservoir, Calero Reservoir, and Almaden Lake. In addition, nutrients, algae, and bacteria is monitored. Select results relevant to the Project are presented below.

Nutrients, Algae, and Bacteria

Under existing conditions, Almaden Lake experiences eutrophication due to high nutrient levels, limited circulation, and elevated summer water temperatures. With respect to nutrients, nitrates and phosphates can be delivered from animal feces (particularly birds), contributing areas of the upstream watershed, urban runoff, and over application of fertilizers in nearby landscaping and neighborhoods. Nitrogen fixation from cyanobacteria blooms represents an additional source of nitrogen to the system, while atmospheric deposition and geologic sources can support phosphorus release. Upstream land uses, including a golf course and nursery, have the potential to contribute nutrients to the watershed, including Almaden Lake, during periods of runoff. Large populations of waterbirds, including Canada geese, gulls, mallards, egrets, herons, and others also have the potential to contribute nutrients, as well as bacteria, through their fecal matter. Under favorable conditions, algae grow rapidly. However, algal cells are short lived, resulting in high levels of senescent (dead) algal material that sinks to the bottom of the water column. In lake bottom waters and lake bottom surficial sediments, bacteria consume this material and oxygen, resulting in low dissolved oxygen concentrations which are conducive to the mercury methylation processes described below.

Monitoring of ammonia, nitrate, total phosphorous, and sulfate has been conducted in Almaden Lake since 2005. Results of those efforts indicate that (SCVWD, 2017)):

- Total phosphorous concentrations were significantly higher in Almaden Lake than in the reservoirs
- Nitrate concentrations average 2.6 mg/L
- Ammonia mean concentrations was 2.3 mg/L

When high nutrients, high temperatures, and low circulation co-occur, significant algal bloom events can develop. Prior studies of Almaden Lake have identified large bloom events in Almaden Lake during the spring and summer months (Horizon, 2013), including cyanobacteria blooms as recently as August/September of 2018.

Bacteria concentrations have been historically high in Almaden Lake, and have resulted in the closure of the lake to swimming and other water contact activities. Samples from surface layers of the lake have indicated strong presence of bacteria, including coliform and E. coli

(Horizon, 2013). Monitoring results from 2011 and 2012 indicated bacteria concentrations ranged from:

- Less than 5 to 4,610 MPN/100 mL (average 392 MPN/100 mL) for E. coli;
- 477 MPN/100 mL to too numerous to count (average 2,740 MPN/100 mL) for total coliform

These concentrations are generally high, with San Francisco Regional Water Quality Control Board (RWQCB) steady state objectives for E. coli at 126 MPN/100 mL, and for total coliform at less than 240 MPN/mL on average and no sample exceeding 10,000 MPN/mL.

Mercury

Mercury is a toxic heavy metal that is found naturally in certain geologic formations. In California, active mercury mines were founded starting during the gold rush era. A total of 131 California reservoirs recently sampled are identified as mercury-impaired (https://www.waterboards.ca.gov/water_issues/programs/mercury/reservoirs/).

Approximately 38 million kilograms of mercury were produced in the New Almaden Mining District, located in the Guadalupe River Watershed, upstream of Almaden Lake. Roughly 70 percent of this production occurred prior to 1875, and about 80 percent before 1935. Prior to the mining era, there were no lakes or other large natural impoundments in the Guadalupe River Watershed (RWQCB, 2006). Prior to construction of the Guadalupe and Almaden Reservoirs in 1935, roasted mine wastes, called calcines, and other mine wastes were disposed in or near the creeks so that the materials would be transported downstream by winter flows. Calcines and other mine wastes are still present in and along the banks of Alamitos Creek, and provide an active source of mercury to the watershed (Tetra Tech 2005). However, the District has made an effort to clean up calcines in Alamitos Creek. Other landowners in the former mining district (County of Santa Clara, Midpeninsula Regional Open Space District and Guadalupe Rubbish Company) have also performed remediation of mining wastes. In addition to the legacy mercury mines and debris in the watershed, additional mercury sources include natural mineral springs and native soils, urban runoff, and atmospheric deposition.

Mercury in South San Francisco Bay sediments is primarily a result of mercury released from historical Coast Range mercury mines (primarily those upstream of Almaden Lake [McCord, 2016]). Mining waste has been identified as the likely source of mercury in the bottom sediments of both the Almaden and Guadalupe reservoirs. In addition, particulate and dissolved mercury loads continue to be transported to Almaden Lake during each wet season.

New Almaden Mine is of significant concern due to high concentrations of mercury-laden waste material and high rates of methylmercury production and bioaccumulation that occur in downstream impoundments. Almaden Lake maintains very high levels of mercury, caused by entrapment of mercury-laden sediment in the lake and to a lesser extent urban runoff. These sediments can be carried downstream into Guadalupe River and San Francisco Bay.

Substantial amounts of mercury are carried along the Guadalupe River, entrained in sediments. A 2010 study of mercury along the watershed measured sediment-bound mercury transport rates along the Guadalupe River of 0.04 to 6.7 kg per day, varying seasonally. On average, at least 96% of all mercury transport through the Guadalupe River was found to be associated with particles (McKee et al., Hunt, 2011).

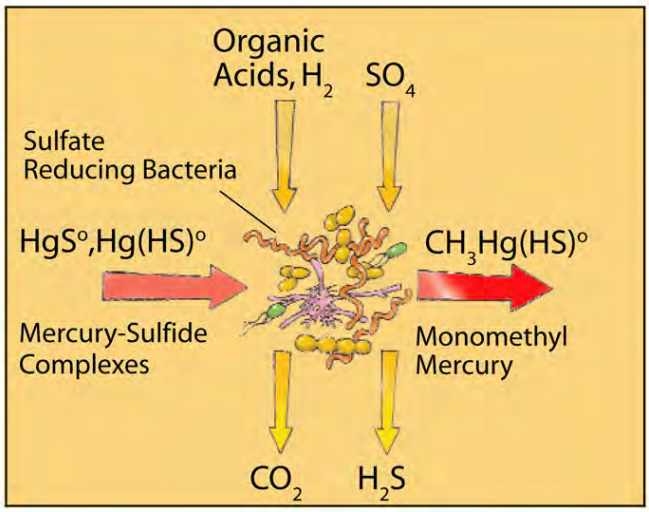
Methylmercury

The primary environmental concern with mercury is exposure to methylmercury (MeHg). Exposure to MeHg comes predominately from eating fish and shellfish that have accumulated it through their food web. Microscopic algae can concentrate dissolved MeHg approximately 100,000-fold, making this a critical first step in the biomagnification process (Watras et al., 1994). In turn, human consumption of contaminated fish and wildlife poses significant health risks (U.S. EPA, 2009). MeHg is linked to developmental problems in fetuses and children and to nervous system effects in adults (U.S. EPA, 2001). Similar developmental and nervous system effects have been observed in wildlife globally (Weiner et al., 2003) and in Bay Area birds (Ackerman et al., 2008).

Methylmercury Production and Cycling

Methylmercury is produced under specific conditions that commonly occur in Almaden Lake. During the summer, the lake tends to stratify – that is, upper layers become warm, heated by the sun and warm air, while deep layers of the lake remain cool. During periods of stratification, vertical mixing is inhibited, stopping the transport of oxygen to deeper water. Particulate organic matter produced in upper layers of the lake (mostly algae) sinks into the lower layers of the lake, where it is decomposed by microbes. This decomposition process consumes oxygen, which reduces oxygen concentrations in the lower levels of the lake. After oxygen is consumed, microbes at the lake bottom can no longer use oxygen to support their metabolic processes. Certain microbes can use other chemicals, besides oxygen, to support their metabolic process. If dissolved mercury is present during low oxygen conditions (which it is in Almaden Lake), anaerobic iron and sulfate-reducing bacteria convert mercury to methylmercury as a byproduct of their metabolic process. These processes stop when oxygen is present, but resume when bottom waters (and surficial lake bottom sediments) return to low oxygen conditions.

Under certain conditions, low oxygen conditions can persist for long periods in the lake, leading to extended periods of time when mercury methylation can occur. For example, during 2014 through 2015, temperature stratification of the lake persisted almost throughout the year, and low oxygen conditions (i.e., dissolved oxygen below 2 mg/L) persisted in the deepest region of the lake. During the 2016-2017 sampling period, temperature stratification did not occur throughout the whole year, but for longer than occurs in the reservoirs. Such conditions have the potential to support mercury methylation during an extended period.



SOURCE: McCord, 2016, and references therein.

Figure 3.K-2
Mercury Methylation Schematic

Methylmercury Bioconcentration

Methylmercury is readily bioaccumulated and transferred through food webs, and can biomagnify to high concentrations in certain species. Algae absorb methylmercury from the water column through passive diffusion. Zooplankton consume the algae, and the methylmercury remains in their bodies. Fish that consume the zooplankton, and larger fish that consume smaller fish also carry the methylmercury in their bodies. As a result, methylmercury concentrations are elevated further up the aquatic food chain. Bioconcentration is therefore especially problematic for birds and humans that consume larger fish from mercury contaminated waters, due to high concentrations of toxic methylmercury.

Almaden Lake Mercury Concentrations and Safety Advisories

In March 2015, four (4) discrete sediment samples were collected from Almaden Lake from depths between 3 feet to 10 feet below top of sediment. Mercury concentrations ranged from 4.5 to 29 (average 19) mg total mercury per kg of sediment. These values are high relative to the most commonly used environmental screening level of 1.3 mg/kg (RWQCB, 2016) and the California thresholds for hazardous waste classification (Total Threshold Limit Concentrations) of 20 mg/kg (California Code of Regulations, Title 22, Chapter 11, Article 3).

Fish downstream of the New Almaden Mining District have extremely high concentrations of mercury in their tissues. As of 2004, Guadalupe Reservoir had the highest recorded fish mercury concentrations in California—about 20 times higher than the U.S. Environmental Protection Agency (U.S. EPA) methylmercury criterion. In 1987, Santa Clara County issued a fish consumption advisory warning people not to eat any fish from Guadalupe, Almaden and Calero reservoirs, Guadalupe and Alamitos creeks, the Guadalupe River, and percolation ponds along the river and creeks. The Office of Environmental Health Hazard Assessment (OEHHA) advises that no one consume fish from the Guadalupe River Watershed waters because elevated mercury concentrations are unsafe for any individual (OEHHA, 2015). Additionally, fish advisories are posted at Almaden Lake.

Methylmercury Management Practices Implemented to Date

To reduce oxygen depletion in the deep layers of the lake, the District operates four solar-powered circulators. These are designed to mix surface water with higher dissolved oxygen into lake bottom waters and vice versa, thereby increasing oxygen content of lower layers and reducing mercury methylation. The first circulator was deployed in 2006, a second in 2007, and two more in 2009. The devices draw water to the surface through a vertical pipe, where it is oxygenated by contact with air at the surface. The devices were shown to provide some benefit, by partially reducing methylmercury concentrations in the lowest layers of the lake, but have not been effective enough to reduce bioconcentration in the lake. While peak methylmercury concentrations in the lowest layers of the lake have decreased since installation of the mixers, concentrations in the middle and upper layers of the lake have not significantly changed. As a result, methylmercury concentrations in small and large fish have not meaningfully decreased since 2005, and both size classes continue to greatly exceed applicable TMDL objectives (McCord, 2016; SCVWD, 2017).

Summary of Conditions Affecting Lake Water Quality

As noted previously, Almaden Lake was formed when a levee breech resulted in the flooding of a quarry on site. The result is a lake that exhibits an irregular bathymetry that sustains long periods of hypolimnetic anoxia. High levels of mercury in the lake's watershed, combined with relatively low flows through the lake, in comparison to its volume, have resulted in the deposition of mercury in the lake. Limited circulation combined with high summer temperatures and high nutrient concentrations drives dry season algal blooms in the lake, which directly contributes to low dissolved oxygen in deep areas of the lake. Low dissolved oxygen, which has been shown to persist in deep areas of the lake for most of the year, enables microbes to convert mercury into methylmercury, which is toxic and bioaccumulates up the food chain. Fecal matter input from waterbirds contribute nutrients, which may support algal blooms, and may also contribute to very high concentrations of coliform and other bacteria observed in the upper water column.

Proposed Source Water Characteristics

As discussed in Chapter 2, Project Description, the Project would rely on untreated raw water from the Almaden Valley Pipeline. Almaden Valley Pipeline water is typically imported water under the District's Central Valley Project (CVP) contract, and comes from the delta via San Luis Reservoir through a series of pipes that brings water into Santa Clara County for distribution to water treatment plants, percolation facilities, Anderson Reservoir, Calero Reservoir and/or local creeks for in-stream recharge. In addition to imported water, the Almaden Valley Pipeline can convey water captured at Anderson Reservoir and Calero Reservoir for water supply uses. Water quality in San Luis Reservoir and Calero Reservoir is considered impaired for mercury (refer to the discussion of the 303(d) List of Impaired Water Bodies, below), but otherwise has generally good water quality without other impairments (RWQCB, 2016).

Waterborne mercury and methylmercury concentrations in Calero Reservoir are monitored regularly as part of the Guadalupe River Watershed Mercury TMDL. Flow weighted annual

average mercury concentrations ranged from approximately 6.1 to 10.2 ng/L during the 2010 through 2017 monitoring period, whereas methylmercury concentrations ranged from approximately 0.1 to 2.7 ng/L during 2010 through 2017 (SCVWD, 2017).

3.K.2 Regulatory Setting

Federal Regulations

Clean Water Act

The federal Clean Water Act (CWA) and subsequent amendments, under the enforcement authority of the U.S. EPA, was established "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The CWA established the basic structure for regulating discharges of pollutants into the waters of the United States. It gave the U.S. EPA the authority to implement pollution control programs, such as setting wastewater standards for industry and requirements for stormwater control. In California, the State Water Resources Control Board (SWRCB) and nine RWQCBs are delegated the authority to implement and enforce compliance with the CWA via California's Porter-Cologne Water Quality Control Act.

303(d) List of Impaired Water Bodies and Total Maximum Daily Loads

Under Section 303(d) of the CWA, states are required to develop a list of impaired waters, which are water bodies that do not meet state water quality standards. Water quality standards include designated beneficial uses and water quality objectives (WQOs) (40 CFR 131.3(i)). Inclusion of a waterbody on the Section 303(d) List of Impaired Water Bodies triggers development of a TMDL for that waterbody and a plan to control the associated pollutant/stressor that a waterbody can assimilate and still meet water quality standards. Typically, a TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources.

Almaden Lake, plus all upstream waterbodies–Almaden Reservoir, Calero Reservoir, and Alamitos Creek – are included on the 303(d) list for mercury impairment. Guadalupe Reservoir and Guadalupe Creek are also listed for mercury impairment, and the Guadalupe River is listed for mercury, diazinon, and trash impairment (RWQCB, 2016). Due to elevated mercury concentrations in fish tissue in several waterbodies in the Guadalupe River Watershed, a mercury TMDL was adopted by the Regional Board in 2008 and approved by the EPA for the watershed in 2010 as a strategy to address mercury pollution (U.S. EPA, 2010).

State Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) provides the basis for water quality regulation within California. This Act establishes the authority of the SWRCB and the nine RWQCBs. The SWRCB administers water rights, sets state policy for water pollution control, and implements various water quality functions

throughout the state, while the RWQCBs conduct planning, permitting, and most enforcement activities. The Project site lies within the jurisdiction of the San Francisco Bay RWQCB (Region 2), and references to the RWQCB throughout this section refer to Region 2.

The Porter-Cologne Water Quality Control Act requires the SWRCB and/or the RWQCBs to adopt statewide and/or regional water quality control plans, the purpose of which is to establish water quality objectives for specific water bodies. In the San Francisco Bay region, the Water Quality Control Plan, known as the Basin Plan, is the RWQCB's master policy document. The Act also authorizes the SWRCB and RWQCBs to implement the National Pollutant Discharge Elimination System (NPDES) program, which establishes discharge limitations and receiving water quality requirements for discharges to waters of the United States.

Water Quality Control Plans and Beneficial Uses

The RWQCB's Basin Plan establishes regulatory standards and objectives for water quality in the San Francisco Bay region (RWQCB, 2015a). The Basin Plan identifies existing and potential beneficial uses for surface water and groundwater and provides numerical and narrative water quality objectives designed to protect those uses. Applicable water quality objectives for a specific water body are determined on the basis of the beneficial use(s) of the water. The Basin Plan also specifies that beneficial use designations for any given water body do not rule out the possibility that other beneficial uses exist or have the potential to exist. Existing beneficial uses that have not been formally designated in the Basin Plan are protected whether or not they are identified.

The RWQCB Water Quality Control Plan (Basin Plan) designates Almaden Lake as supporting the following beneficial uses:

- Municipal and Domestic Supply (MUN)
- Groundwater Recharge (GWR)
- Cold Freshwater Habitat (COLD)
- Preservation of Rare and Endangered Species (RARE)
- Fish Spawning (SPWN)
- Warm Freshwater Habitat (WARM)
- Wildlife Habitat (WILD)
- Body-contact Recreation (REC1 - potential)
- Noncontact Water Recreation (REC2)

Of the above designated uses, the uses that are most directly sensitive to mercury and methylmercury levels are those related to habitat for aquatic organisms; specifically COLD, WARM, SPWN, WILD, and RARE. While the Basin Plan lists REC1 (including full body-contact recreation) as a beneficial use of Almaden Lake, swimming and wading in the lake are not allowed by the City of San José, due to water quality concerns related to high fecal indicator bacteria counts and frequent cyanobacteria blooms.

The Basin Plan contains narrative and numeric WQOs that apply to most waters in the region and are intended, in part, to ensure that beneficial uses are protected. As previously discussed, in 2008 the RWQCB adopted a TMDL for mercury in water for Almaden Lake and site-specific objectives for mercury in fish tissue. In addition, due to the lake's uneven depth and high nutrient and organic matter from algal blooms and waterbirds, anoxic conditions exist in bottom waters in which microbes readily transform elemental mercury in the sediment into methylmercury. The current WQOs for biostimulatory substances (i.e., nutrients) and mercury are cited below from the Basin Plan. While it is recognized that other WQOs exist for additional water quality constituents (pathogens, metals, etc.), the objectives presented below are the most relevant for water quality concerns in Almaden Lake.

Biostimulatory Substances

Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. Changes in chlorophyll a and associated phytoplankton communities follow complex dynamics that are sometimes associated with a discharge of biostimulatory substances. Irregular and extreme levels of chlorophyll a or phytoplankton blooms may indicate exceedance of this objective and require investigation.

Mercury

The WQOs for mercury shown in Table 3.K-1 are applicable to the Project:

TABLE 3.K-1
FRESHWATER WATER QUALITY OBJECTIVES FOR
MERCURY IN THE GUADALUPE RIVER WATERSHED

Protection of Aquatic Organisms and Wildlife[1]	0.05 mg methylmercury per kg fish	Average wet weight concentration measured in whole trophic level 3 fish 5–15 cm in length
	0.1 mg methylmercury per kg fish	Average wet weight concentration measured in whole trophic level 3 fish 15 – 35 cm in length

[1] The freshwater water quality objectives for the protection of aquatic organisms and wildlife also protect humans who consume fish from the Walker Creek and Guadalupe River watersheds.

SOURCE: RWQCB, 2015a

Note that additional numeric WQOs are also identified under the Basin Plan for mercury, including: (1) 2,000 nanograms of mercury per liter (ng/L) of water for municipal supply; and (2) 25 ng/L four day average and 2,400 ng/L one-hour average for toxic effects. The California Toxics Rule also limits total mercury concentrations in freshwater sources of drinking water to 50 ng/L as a 30-day average. However, these objectives are much greater than the mercury concentrations needed in water to result in protective fish tissue objectives. Therefore, it is the fish tissue objectives shown above that drive the current regulatory approach within Almaden Lake.

Guadalupe River Watershed Mercury TMDL and Implementation Plan

The Guadalupe River Watershed Mercury TMDL and implementation plan are designed to resolve mercury impairment in waters downstream of mercury mines in the Guadalupe River Watershed, including Alamitos Creek and Almaden Lake (RWQCB, 2008). The TMDL allocation applicable to Almaden Lake is 1.5 ng/L methylmercury, expressed as a seasonal maximum methylmercury concentration in the hypolimnion.[1] The TMDL allocation that applies to Alamitos Creek is 0.2 mg mercury per kg suspended sediment (dry weight, annual median). This allocation is based on the Bay-wide suspended sediment mercury concentration target of 0.2 mg mercury per kg dry sediment.

The Guadalupe River Watershed mercury TMDL's implementation is proceeding over two phases. The first phase began on January 1, 2009, with goals for effective source control measures for mining waste at mine sites; completion of studies to reduce discharge of mining waste accumulated in Alamitos Creek; and completion of studies of methylmercury and bioaccumulation controls in reservoirs and lakes. The goal for the second 10-year phase of implementation will be the attainment of the watershed fish tissue targets and the San Francisco Bay mercury TMDL allocations to urban stormwater runoff and legacy mercury sources in the Guadalupe River Watershed, by December 31, 2028.

Waste Discharge Requirements

NPDES Discharge Permits

The federal CWA established the NPDES program to protect the water quality of receiving waters of the United States. Under the CWA, Section 402, discharging pollutants to receiving waters of the United States is prohibited unless the discharge is in compliance with an NPDES permit. For California, the U.S. EPA determined that the state's water pollution control program had sufficient authority to manage the NPDES program under California law in a manner consistent with the Clean Water Act.

Municipal Regional Stormwater Permit

In 2015, the RWQCB re-issued the Municipal Regional Stormwater NPDES Permit, RWQCB Order No. R2-2015-0049 (MRP) to regulate stormwater discharges from municipal separate storm sewer systems (MS4s) from municipalities and local agencies in Alameda, Contra Costa, San Mateo, and Santa Clara Counties, plus the cities of Fairfield, Suisun City, and Vallejo (Permittees). The MRP requires the Permittees to enact pollution prevention and control actions and pollutant impact assessments to comply with applicable TMDLs and other WQOs (RWQCB, 2015b).

Stormwater runoff in the areas regulated by the MRP flows into the San Francisco Bay and Suisun and San Pablo Bays. The quality and volume of runoff varies according to hydrology, geology, land use, season, and sequence and duration of hydrologic events. Pollutants of concern include heavy metals, sediment, petroleum hydrocarbons, microbial pathogens,

[1] Hypolimnion refers to the lower levels of water in a lake, just above the lake bed. These waters are typically cooler than upper levels of the lake, and can become stagnant.

pesticides, nutrients, and trash. Some pollutants are from extraneous sources such as particulate deposition onto impervious surfaces, in which jurisdictions have little control. Permittees are required to implement BMPs to the standard defined as the "maximum extent practicable" to minimize the extent of pollutants entrained in stormwater. The RWQCB also requires actions to protect the water quality of receiving waters. Annual reports are required to be submitted by co-permittees, documenting compliance with applicable elements of the MRP.

Section C.6 of the MRP includes requirements for a construction site inspection and control program at all construction sites to prevent construction site discharges of pollutants into storm drains. Permittees have legal authority to oversee, inspect, and require compliance at construction sites with regards to effective erosion control, run-on and runoff control, sediment control, active treatment systems, good site management, and non-storm water management.

Statewide General Permit for Construction Activity

The State of California adopted a revised Construction General Permit (CGP) on September 2, 2009 (Order No. 2009-0009-DWQ as amended by 2010-0014-DWQ and 2012-0006-DWQ) (General Construction NPDES Permit). The General Construction NPDES Permit regulates construction site storm water management. Dischargers whose projects disturb one or more acres of soil, or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the CGP for discharges of storm water associated with construction activity. The Project would be required to comply with the permit requirements to control stormwater discharges from the construction sites. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

In the Project area, the CGP is implemented and enforced by the SWRCB, which administers the stormwater permitting program. To obtain coverage under this permit, Project operators must electronically file Permit Registration Documents, which include a Notice of Intent, a Stormwater Pollution Prevention Plan (SWPPP), and other compliance-related documents. An appropriate permit fee must also be mailed to SWRCB. The SWPPP identifies BMPs that must be implemented to reduce construction effects on receiving water quality based on potential pollutants. The BMPs identified are directed at implementing both sediment and erosion control measures and other measures to control potential chemical contaminants. The SWPPP also includes descriptions of the BMPs to reduce pollutants in storm water discharges after all construction phases have been completed at the site (post-construction BMPs). Dischargers are responsible for notifying the SWRCB of violations or incidents of non-compliance, as well as for submitting annual reports identifying deficiencies of the BMPs and how the deficiencies were corrected.

The permit includes several new requirements (as compared to the previous CGP, 99-08-DWQ), including risk-level assessment for construction sites, an active storm water effluent

monitoring and reporting program during construction (for Risk Level II and III sites), rain event action plans for certain higher risk sites, and numeric effluent limitations for pH and turbidity as well as requirements for qualified professionals that prepare and implement the plan. The permit became effective July 1, 2010.

Regional and Local Regulations

Santa Clara Valley Water District Groundwater Management Plan

The District is the Groundwater Sustainability Agency for the entire Santa Clara Subbasin and has prepared the 2016 Groundwater Management Plan (GMP) that describes basin conditions, sustainability goals, strategies, programs, and outcome measures for the entire Santa Clara Subbasin. The GMP was adopted by the District's Board of Directors in November 2016. Briefly, the GMP recognizes the District's extensive water management infrastructure, including groundwater pumping and recharge facilities; reviews historic groundwater levels and land subsidence; identifies subbasins; and outlines a series of sustainability goals and strategies, basin management programs and activities, and targeted outcome measures relevant to groundwater management as a resource in the District's service area.

City of San José Post-Construction Urban Runoff Management Policy (6-29)

The purpose of the Post-Construction Urban Runoff Management Policy (6-29) is to establish requirements to minimize and treat stormwater runoff from new development and redevelopment projects, pursuant to the MRP. Redevelopment is development on previously developed properties. Policy 6-29 requires projects to manage stormwater based on the proposed land use and amount of impervious surface area being created and/or replaced by the project. Provisions vary in accordance with MRP project types (discussed below) and incorporate requirements for certain Land Uses of Concern that involve outdoor handling and/or storage of material that have potential to contaminate stormwater runoff (City of San José, 2011). Policy 6-29 regulates the following categories of projects that are applicable to the Project:

> All Development Projects: Site Design and Source Control Measures are encouraged. All new and redevelopment projects regardless of size and land use are encouraged to incorporate site design and pollutant source control practices in a manner consistent with the strategies set forth in this Policy. Pollution prevention measures shall be incorporated into development plans and maintained in perpetuity once constructed.

Policy 6-29 establishes three primary strategies to manage stormwater runoff:

- Minimize Runoff through Site Design (Quantity Control)
- Prevent Polluted Runoff with Source Control
- Treat Stormwater with Low Impact Development (LID)

City of San José General Plan

MS-17.2. Ensure that development within San José is planned and built in a manner consistent with fiscally and environmentally sustainable use of current and future water supplies by encouraging sustainable development practices, including low-impact development, water-efficient development and green building techniques. Support the location of new development within the vicinity of the recycled water system and promote expansion of the South Bay Water Recycling (SBWR) system to areas planned for new development. Residential development outside of the Urban Service Area can be approved only at minimal levels and only allowed to use non-recycled water at urban intensities. For residential development outside of the Urban Service Area, restrict water usage to well water, rainwater collection, or other similar environmentally sustainable practice. Non-residential development may use the same sources and potentially make use of recycled water, provided that its use will not result in conflicts with other General Plan policies, including geologic or habitat impacts. To maximize the efficient and environmentally beneficial use of water outside of the Urban Service Area, limit water consumption for new development so that it does not diminish the water supply available for projected development in areas planned for urban uses within San José or other surrounding communities.

ER-8.1. Manage stormwater runoff in compliance with the City's Post-Construction Urban Runoff (6-29) and Hydromodification Management (8-14) Policies.

ER-8.4. Assess the potential for surface water and groundwater contamination and require appropriate preventative measures when new development is proposed in areas where storm runoff will be directed into creeks upstream from groundwater recharge facilities.

ER-8.5. Ensure that all development projects in San José maximize opportunities to filter, infiltrate, store and reuse or evaporate stormwater runoff onsite.

ER-9.4. Work with the District to preserve water quality by establishing appropriate public access and recreational uses on land adjacent to rivers, creeks, wetlands, and other significant water courses.

ER-9.5. Protect groundwater recharge areas, particularly creeks and riparian corridors.

EC-5.1. The City shall require evaluation of flood hazards prior to approval of development projects within a Federal Emergency Management Agency (FEMA) designated floodplain. Review new development and substantial improvements to existing structures to ensure it is designed to provide protection from flooding with a one percent annual chance of occurrence, commonly referred to as the "100-year" flood or whatever designated benchmark FEMA may adopt in the future. New development should also provide protection for less frequent flood events when required by the State.

EC-5.3. Preserve designated floodway areas for non-urban uses.

EC-5.4. Develop flood control facilities in cooperation with the Santa Clara Valley Water District to protect areas from the occurrence of the "1%" or "100-year" flood or less frequent flood events when required by the State.

EC-5.10. Encourage the preservation and restoration of urban creeks and rivers to maintain existing floodplain storage. When in-channel work is proposed, engineering techniques which include the use of plant materials (bioengineering) are encouraged.

EC-5.16. Implement the Post-Construction Urban Runoff Management requirements of the City's Municipal NPDES Permit to reduce urban runoff from project sites.

IN-3.11. The "modified floodplain design" is the preferred design for future flood protection facilities. Use the "widen-one-bank" and "trapezoidal channel" designs only when funding or right-of-way limitations make the use of the modified flood plain design impractical. For future development, consider factors such as flooding risks, proximity to waterways, and the potential for implementing flood protection measures.

3.K.3 Impacts and Mitigation Measures

Significance Criteria

Implementation of the Project would have a significant impact on hydrology and water quality if it were to:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality;
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
  - result in substantial erosion or siltation on- or off-site;
  - substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
  - create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
  - impede or redirect flood flows
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation;
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Approach to Analysis

Avoidance and Minimization Measures Incorporated into the Project

Avoidance and minimization measures are those parameters that have been built into the design of the Project and are committed to as part of Project implementation. These measures are generally included in the Project Description (Section 2.E.1) of this report.

WQ-3. Limit Impact of Pump and Generator Operation and Maintenance.

WQ-5. Stabilize Construction Entrances and Exits.

WQ-6. Limit Impact of Concrete Near Waterways.

WQ-9. Use Seeding for Erosion Control, Weed Suppression, and Site Improvement.

WQ-10. Prevent Scour Downstream of Sediment Removal.

WQ-12. Manage Well or Exploratory Boring Materials.

WQ-13. Protect Groundwater from Contaminates Via Wells or Exploratory Borings.

WQ-15. Prevent Water Pollution.

WQ-16. Prevent Stormwater Pollution.

No Impact Significance Determinations

Based on the nature of the Project, there would be no impact related to the following criterion:

Placement of Housing within a 100-Year Flood Zone. The Project does not propose the construction of housing, so there would be no impact related to the construction of housing within a 100-year flood zone. Therefore, this criterion is not applicable to the Project and is not discussed further.

Risk of Loss, Injury, or Death Involving Inundation by Seiche, Tsunami, or Mudflow. The Project would involve recontouring and reducing the volume of Almaden Lake, an existing inland lake. The lake is located at an elevation of 191 feet above sea level, and is situated 13 miles inland from the San Francisco Bay. As such it is not susceptible to tsunami. Potential for mudflow at the Project site is also considered minimal. While the watershed feeding into Almaden Lake contains mountainous terrain, these areas are generally well vegetated, and do not contain soil types prone to mass flows. Additionally, impoundments upstream of the Project area would contain any mudflows, even in the unlikely event that such an event were to occur. With respect to seiche, Almaden Lake, as a large enclosed water body, is under existing conditions susceptible to seiche, particularly during geologic movement. The Project would reduce the volume and area of the lake, resulting in a smaller water body that continues to be susceptible to seiche. While the lake would remain susceptible to seiche, the Project would not install housing or other facilities that could be substantially damaged, in the event that a seiche were to occur. Nor would it include new embayments, permanent harbors, or other features that could increase susceptibility to seiche. Therefore, no increase in the intensity of potential seiche events is anticipated at the Project site, in comparison to baseline conditions, no impact would occur, and this issue is not discussed further.

Impact Summary

Table 3.K-2 provides a summary of hydrology and water quality impacts by implementation phase (construction and operations).

TABLE 3.K-2
SUMMARY OF HYDROLOGY AND WATER QUALITY IMPACTS

Impact Statement	Construction	Operation
Impact 3.K-1: The Project would violate water quality standards or waste discharge requirements, conflict with or obstruct implementation of the Basin Plan, or otherwise substantially degrade surface or groundwater quality.	LSM	LS
Impact 3.K-2: The Project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin or conflict with the Groundwater Management Plan.	LS	LS
Impact 3.K-3: The Project would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which could: (i) Result in substantial erosion or siltation offsite (ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite (iii) Create or contribute runoff water which would exceed the capacity of existing planned stormwater drainage systems or provide substantial additional sources of polluted runoff (iv) Impede or redirect flood flows	LSM	LS

LS = Less than significant
LSM = Less than significant with mitigation

Impacts and Mitigation Measures

Impact 3.K-1: The Project would violate water quality standards or waste discharge requirements, conflict with or obstruct implementation of the Basin Plan, or otherwise substantially degrade surface or groundwater quality. (Less than Significant with Mitigation)

Construction Impacts

Construction of the Project would require the use of heavy construction equipment, the use of which could result in the release of water quality pollutants into the environment. For example, use and refueling of graders, bulldozers, large trucks, and other equipment could result in spills of fuels, lubrication oil, hydraulic oil, and other potential water quality pollutants. Construction could also include the use of paints, generation of concrete wash-out, on-site / staging area storage of fuels and oils, and other items that could be released into the environment. The District implements BMPs WQ-3, WQ-5, WQ-6, WQ-9, WQ-10, WQ-12, WQ-13, WQ-15 and WQ-16, to reduce potential for releases of water quality contaminants during construction by preventing hazardous materials used during construction from entering waterways, minimizing erosion associated with construction, and planting bare ground at the end of construction. Furthermore, the Project would be required to acquire coverage under the Construction General Permit. Conditions of the permit would require deployment of additional water quality pollutant minimization measures, including construction and equipment related BMPs, and stormwater management BMPs. Adherence to existing regulation and implementation of District BMPs would ensure that construction period stormwater pollutant impacts would be minimized and would be less than

significant, and that any potential water quality releases would not degrade beneficial use or interfere with implementation of the Basin Plan.

As discussed in Chapter 2, Project Description, trenchless drilling techniques would be used to construct the pipeline crossing of Guadalupe Creek and Alamitos Creek. The intent of utilizing this pipeline installation technique is to stay far enough below the bottom of surface water features to avoid having the drilling fluids find a fissure in the soil, which would create a connection to the water above, resulting in a leak of drilling fluids, such as Bentonite clay, into surface waters. The project includes use of standard control measures including training of construction personnel, methods for preventing accidental release (including maintaining pressure in the borehole and continuous monitoring of slurry volumes at the exit and entry pits), clean-up requirements, and notification requirements to prevent leak of drilling fluids. If such leaks were to occur, the drilling fluids leaking into a surface water feature could directly impact water quality, such as by increasing turbidity, and indirectly impact species dependent upon the resource, such as through impacting aquatic wildlife respiration or degrading local habitat (see Section 3.D, *Biological Resources*). However, with use of the control measures, such effects would be minimized and the potential for water quality effects would be less than significant.

During the construction process, Almaden Lake would be drained to allow access to the lake bottom. Draining of the lake would require discharge of lake waters into downstream areas of Alamitos Creek and the Guadalupe River. Discharge of lake waters into Alamitos Creek is generally not anticipated to cause a reduction in water quality downstream, in comparison to existing conditions, because lake waters are already discharged downstream under existing conditions. However, when the lake is drawn down to near bottom, potential mixing of waters with bottom sediments could result in the release of increased sediment loads. Lake bottom sediments are known to contain high concentrations of mercury. In addition, after drawdown of the lake is complete, groundwater dewatering may be required to establish and maintain a dry lake bed to provide a working surface for the construction equipment which could release sediment, mercury, and other potential water quality pollutants to downstream areas. Releases of water containing elevated concentrations of sediment could therefore also contain elevated mercury levels, resulting in a significant impact related to downstream water quality degradation.

Implementation of Mitigation Measure 3.K-1 (Monitor and Manage the Quality of Lake Discharges to Creek) would minimize these effects by ensuring that sediment and/or mercury-laden sediment is not discharged to surface waters. Adherence to this mitigation measure would reduce this impact to less than significant and alleviate potential for conflict with the Basin Plan.

Operations Impacts

The Project includes several measures that would directly address mercury and methylmercury issues relevant to Almaden Lake (see Chapter 2, Project Description). These would include the following:

- Separation of the lake from Alamitos Creek, thereby disconnecting the ongoing supply of mercury-laden sediments and source water from Alamitos Creek into the lake.
- Use of raw water supplied from the Almaden Valley Pipeline, which has imported delta water as a primary water source. Water supplied from the delta carries lower concentrations of mercury and methylmercury than water supplied from Alamitos Creek under existing conditions.
- Removal of and capping of mercury-laden sediments within the existing lake with a clean, impermeable clay layer to minimize flux of methylmercury to the lake from underlying sediments.
- Recontouring (filling and flattening) of the lake bottom sediments, to eliminate deep, isolated pockets which currently appear to harbor low oxygen concentrations and thereby produce the highest concentrations of methylmercury.
- Continuing to operate solar-powered water circulators (SolarBees), and add more circulators, while reducing lake volume, thereby slowing the loss of dissolved oxygen from the lake, reducing mercury methylation; alternatively, deploying vigorous epilimnetic mixing, or equivalent methods.

These activities are expected to substantially reduce mercury and methylmercury concentrations in both lake bottom sediments and in the water column of Almaden Lake, in comparison to existing conditions. During long term operation of the Project, the lake would remain disconnected from sediment-bound mercury associated with the Guadalupe watershed. Elevated levels of mercury-laden sediment would not be delivered to the lake from the Almaden Valley Pipeline. The lake currently receives water and sediment from Alamitos Creek which headwaters included areas of mercury mining and continue to be impacted by legacy mercury. Almaden Valley Pipeline receives water primarily from San Luis Reservoir and Calero Reservoir which have much lighter mercury loads., and The existing mercury-containing sediments would be buried below a clay layer to sufficient depth that they would no longer have potential to intermix with lake bottom waters, lake bottom sediments, or associated microbial communities. Any mercury present in lake waters or sediments would be subject to greatly reduced anoxic conditions, in comparison to the existing lake, due to recontouring and applied vertical mixing. Therefore, the Project is expected to reduce elemental mercury concentrations and greatly alleviate methylmercury production in Almaden Lake.

The Project is also expected to alter other water quality parameters. First, algae concentrations in the lake are likely to decrease with implementation of the Project, because the sediment removal and clay cap would substantially reduce the amount of nutrient rich organic matter in bottom sediments. Local nutrient sources, including waterbirds and urban runoff, would continue to contribute nutrients to the lake. Nonetheless, reduced nutrients available from bottom sediments would reduce the total nutrients available to support algal

productivity as compared to existing conditions. During summer periods, continuous input of at least 5 cfs of Almaden Pipeline water to the system would help to ensure that the lake maintains a flushing rate/water residence time of approximately once per 20 to 35 days, which is generally consistent with or better than existing conditions, helping to reduce temperatures and minimize stagnation of the water body. During winter periods, water residence times would be longer than typical existing conditions. Nonetheless, algal overgrowth is not expected to occur during these periods due to reduced water temperature, lower light levels, and reduced nutrient source from bottom sediments. Therefore, the Project is expected to generate a net reduction in algal concentrations and a net reduction in bloom conditions during Project operation. It is noted that continuous input may be slowed or halted during periods of drought, high groundwater levels in the groundwater basin, or when other water rights would need to be exercised in the Alamitos Percolation Pond; however, water loss in the lake is expected to be minimal due to evaporation and water would not become stagnant and temperature would not be expected to increase substantially, and therefore, algal overgrowth would not occur during these periods.

Dissolved oxygen levels, especially in the lower levels of the lake, are directly tied to algal productivity and internal lake circulation rates. As discussed previously, high levels of algal productivity can cause microbes in bottom waters to rapidly consume available oxygen, driving down dissolved oxygen levels. Therefore, a combination of reduced algal productivity and increased in-lake circulation (due to a shallower lake bottom and applied mixing) under the Project is expected to minimize potential for low dissolved oxygen levels as compared to existing conditions. Therefore, the Project is likely to generate a net benefit over existing conditions with respect to dissolved oxygen levels.

Nitrogen and phosphorous in the lake are currently derived from a combination of upstream sources, decaying organic matter contained in bottom sediments, nitrogen fixation during cyanobacteria blooms, urban runoff, and waterbirds. The Project would reduce or remove select sources of nutrients to the lake as follows:

- The Project would avoid inputs of nutrients from upstream along Alamitos Creek/the Guadalupe River watershed.
- The Project would cap bottom sediments, eliminating them as an immediate source of nutrients to the lake.
- The Project may reduce the incidence of algal blooms (including cyanobacteria) as a result of removal of existing bottom sediments, helping to drive down the introduction of nutrients from these sources.

The Project would not alter nutrient inputs from the following sources:

- Urban runoff would continue to provide nitrogen and, to a lesser extent phosphorous, to the system.
- Waterbirds would continue to provide nitrogen and phosphorous to the system.

In addition, the Project could result in an increase in nutrients available for primary production from the following sources:

- Application of pesticides by releasing nutrients stored in living organic matter back into the water column. Pesticides would be applied intermittently if / as needed.

Creating a flow-through system utilizing imported source water, and providing a continual flow of water through the lake would decrease water's residence time, which may improve water quality. These improvements would be expected to improve the ecological health of the aquatic-to-terrestrial food chain in the lake, should fish be introduced into the lake again through the transfer pipeline or other means, while also reducing methylmercury entering San Francisco Bay. Such improvements also would be designed to create a less eutrophic lake (i.e., fewer algal blooms).

The creek/lake separation would create new lake and stream margins that would result in an increase of wetland, riparian, and upland vegetation. This increase in vegetation would be designed to enhance the functions associated with these vegetation types, including removal of water nutrients, and slowing and sequestering runoff and associated pollutants and fine sediment before it enters the creek and lake. These actions have been designed to help reduce toxic algal blooms and other water quality issues.

Over time, it is possible that the combined effects of waterbirds, periodic (although less frequent) algal blooms, and senescence of benthic algae would contribute nutrient loads to benthic sediments in the lake. Nutrient balance and dynamics are inherently difficult to predict, especially for a system over long periods of time. Therefore, there exists a possibility that over time, nutrient levels in the lake could increase. However, based on the analysis completed in support of this Project, an increase to the point of exceeding existing levels appears unlikely. Nonetheless, even a moderate level of increase over time could drive increased incidence of oxygen depletion, and a partial recurrence of conditions that would favor the creation of methylmercury in lower levels of the lake. Water column mercury contained in water sourced, in part, from the delta could still drive methylation in the lake under some conditions. However, due to changes in system operation—namely separation from Alamitos Creek, a shallower lake, and improved in-lake mixing—lake conditions would not be expected to return to or underperform in comparison to existing water quality levels.

The restored creek channel would be designed to have a stable geomorphic channel. The geomorphic design would include a riffle-pool-run pattern, designed to neither aggrade nor degrade, for the entire length of the restored creek section. The slope and riffle-pool-run pattern would be similar to the Alamitos Creek channel section immediately upstream of the Project area. Channel design would be informed by two analyses developed by the District:

- Draft Sediment Transport Analysis, which utilized a HEC-RAS sediment transport capacity module to determine sediment transport capacity using bankfull design flow. The analysis compared the existing upstream reach and the restored reach to determine a channel slope that could accommodate anticipated sediment volumes (SCVWD, 2017a).

- Bankfull Discharge Analysis, which utilized a HEC-RAS hydraulic model to determine the effective discharge for Alamitos Creek just upstream of Almaden Lake to appropriately size the creek channel (SCVWD, 2016d).

Project operations could include the use of pesticides to manage emergent and near-water invasive vegetation. Use of pesticides in these areas could result in water quality degradation, particularly if pesticides come in direct contact with water or rainfall. However, as discussed in Impact 3.J-2, use of pesticides would be required to comply with pesticide regulations designed to ensure that the pesticides would be applied in a safe manner to protect the safety of the workers and the public, and in a manner appropriate for the environment. Further, the District has incorporated Avoidance and Minimization Measures into the Project, provided in the District's BMP Handbook. The listed specific measures would further reduce the potential for and minimize the impact of hazardous materials releases through restrictions on upland pesticide application within 72 hours of predicted significant rainfall, utilizing only pesticides registered for aquatic use in aquatic areas, seasonal limitations on aquatic pesticide use, ensuring proper handling of pesticides and protecting the quality of water resources by all reasonable means (as specified in District BMP HM-9).Therefore, compliance with existing regulations and implementation of the Avoidance and Minimization Measures would reduce the impacts related to the use of pesticides to less than significant. No mitigation measures would be required.

Finally, the Project would discharge Almaden Valley Pipeline water (sourced primarily from the delta) from Almaden Lake to the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds, where the water would be infiltrated for groundwater recharge. Under existing conditions, ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds receive~~s~~ water that has passed through Almaden Lake ~~and~~ or Guadalupe Creek. As discussed previously, mercury concentrations in water sourced, in part, from the Delta are lower than those sourced from Almaden Lake. Water could also be sourced from Calero Reservoir which is generally is considered to have good water quality and does not have other water quality impairments, according to the current 303(d) list (see prior discussion of Calero Reservoir and the 303(d) list). Therefore, the Project would likely result in a net improvement in water quality entering the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds, and would avoid degradation of groundwater quality during recharge. Additionally, by reducing the concentration of mercury and methylmercury in Almaden Lake, the Project would help to comply with Basin Plan and TMDL objectives and implementation.

Future maintenance would include bank stabilization as needed, and sediment removal would be required periodically downstream of the Lake, similar to existing conditions ~~that is estimated to be needed every ten years~~. These in-channel activities would comply with the District's Stream Maintenance Program, and the same existing regulations and District BMPs discussed under Construction such as acquiring coverage under the Construction General Permit and implementation of BMPs WQ-3, WQ-5, WQ-6, WQ-9, WQ-10, WQ-12, WQ-13, WQ-15 and WQ-16. Adherence to existing regulation and implementation of District BMPs would ensure that stormwater pollutant impacts during maintenance activities would be minimized and would be less than significant, and that any potential water quality releases would not degrade beneficial use or interfere with implementation of the Basin Plan.

Mitigation Measures

Mitigation Measure 3.K-1: *Monitor and Manage the Quality of Lake Discharges to Creek*. The District and/or its contractor(s) shall monitor the quality of water discharged during drawdown of Almaden Lake during Project construction to ensure all discharges meet Regional Board discharge standards as needed to maintain and preserve beneficial use along downstream waterways, in accordance with the Basin Plan. Initially, water quality shall be tested for turbidity daily during discharge, or as required under the RWQCB Section 401 Water Quality Certification and/or Waste Discharge Permit obtained for the Project. When the lake reaches 10% of its capacity volume, the District shall monitor water quality at least hourly until direct discharge to Alamitos Creek ceases. Monitoring shall be completed in the field using portable equipment. If turbidity concentrations in excess of 500 NTU are detected or as indicated in the Permit, waters shall be treated. Specific measures could include, but would not be limited to, testing for sediment and/or other constituents during pumping to monitor water quality conditions; use of settling basins, baker tanks, or in-line filters for sediment removal; sediment reduction and/or coagulation and filtration, granular activated carbon, lime softening, or membrane filtration to remove mercury; and in-line filtration and other measures to remove other pollutants. Removed sediment shall be tested for mercury concentration, and disposed of in accordance with applicable requirements / regulations. If a dewatering permit from the RWQCB is required, water quality monitoring requirements identified here may overlap with permit requirements. In such a case, monitoring requirements under this mitigation measure could be reduced only to avoid duplicative sampling and analysis.

Significance after Mitigation: Less than Significant. Implementation of Mitigation Measure 3.K-1 would ensure that discharge of sediment laden lake water is minimized to surface waters such that the Project is in compliance with water quality standards, does not substantially degrade surface waters, and does not conflict with implementation of the Basin Plan.

Impact 3.K-2: The Project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin or conflict with the Groundwater Management Plan. (Less than Significant)

Construction Impacts

Project construction would involve drawing down water levels in the existing Almaden Lake, until lake sediments would be exposed. At that point, it is anticipated that additional drawdown of water levels to below the lake bottom would be required, to establish a working surface and to enable excavation of mercury-laden sediments from the lake bottom. In order to accomplish this, as described in Chapter 2, Project Description, dewatering of shallow groundwater would be required.

Dewatering involves the installation of temporary, shallow wells, typically to depths of ten to twenty feet, followed by ongoing pumping, to the extent needed to draw water levels down below the ground surface. Thus, the dewatering process would purposefully result in the temporary drawdown of near surface groundwater to up to several feet below ground

surface. The District does not use shallow groundwater as a water supply, instead relying on the deeper aquifer. While this process would result in a temporary drawdown of shallow groundwater, dewatering operations would cease as soon as possible during the construction process, likely following completion of sediment removal, lake bottom recontouring, and placement of fill to support elements of the Project. Upon completion of construction, shallow groundwater levels would return to normal. Long term alteration of groundwater levels is not anticipated, and the Project would therefore not impede sustainable management of the groundwater basin, in accordance with the GMP.

Project construction outside of the lake area for pipeline installation or lake discharge to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds would include only shallow trenching, and is not anticipated to encounter groundwater or to require groundwater dewatering. Other aspects of Project construction would not require or result in groundwater pumping. Therefore, this impact is considered less than significant.

Operations Impacts

Under the Project, in addition to diverting water downstream of Almaden Lake for groundwater recharge, imported water from Almaden Lake and ultimately sourced from the Almaden Valley Pipeline would be used for recharge. Groundwater recharge, however, would not be reduced. Under existing conditions, the District has water rights to divert 4,350 AFY of water for recharge from Guadalupe River, in addition to imported water released to Alamitos and Guadalupe Creeks, and re-divert water captured and released from Calero, Almaden, and Guadalupe Reservoirs. Under the Project, the District would have available for recharge the same water supply sources for recharge under existing water rights. Therefore, no net reduction in groundwater recharge is expected during Project operations. Project operation would not interfere with or impede sustainable groundwater management of the basin. This impact is considered less than significant.

Mitigation Measures

None required.

Impact 3.K-3: The Project would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which could:

(i) Result in substantial erosion or siltation offsite

(ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or offsite

(iii) Create or contribute runoff water which would exceed the capacity of existing planned stormwater drainage systems or provide substantial additional sources of polluted runoff

(iv) Impede or redirect flood flows (Less than Significant with Mitigation)

Construction Impacts

Erosion and Siltation

As discussed previously, Project construction would result in the use of heavy machinery for earth moving and other purposes on site. Earth moving activities, as well as the use of heavy machinery, would result in the denuding and stockpiling of soils and sediments during the construction process. Much of the construction work would be completed within the basin of Almaden Lake. Any stormwater occurring in these areas would drain into the lake bottom, where it would remain, temporarily, until being pumped out by the temporary construction pumping and dewatering system. Stormwater managed using this system would be managed and treated as discussed in Impact 3.K-1 (see above), and in accordance with Construction General Permit requirements. Stormwater in upland areas affected by Project construction would be managed in accordance with District BMPs, as described above, as well as the requirements of the applicable Construction General Permit, which collectively would ensure that stormwater would be controlled on site to minimize the release of sediments downstream, minimize stormwater contact with stockpiled materials, provide for rapid revegetation of denuded slopes and other areas, stabilize construction entrances and exits, and other measures designed to minimize construction period release of sediments to downstream. These measures would reduce potential for erosion in these areas. Therefore, substantial releases of sediment to downstream are not anticipated during construction, and this impact would be less than significant.

Impervious Surfaces Drainage System Capacity

Impervious surfaces, including building roofs, pavement, concrete sidewalks, and other non-permeable features, can impede the ability of soils to infiltrate groundwater. Where large areas of impervious surfaces are installed, this can result in a net increase in the volume of surface runoff during storm events. Increased surface runoff can, in turn, exacerbate drainage management issues and result in potential downstream increases in flood flows. However, the Project would not result in the construction of substantial new areas of impervious surfaces. To the contrary, the Project would install new landscaped areas, a restored Alamitos Creek channel, and other largely earthen features that are not classified as impervious surfaces. An updated boat ramp, as well as updated sidewalks and other impervious features would be limited in extent, and would largely replace existing features. Therefore, new impervious surfaces would not be expected to result in a significant increase in stormwater runoff, associated flooding, or exceedance of existing drainage system capacity, and this impact is considered less than significant. Potential for the Project to generate polluted runoff is discussed under Impact 3.K-1.

Impede or Redirect Flood Flows

Project construction would result in the temporary closure and draining of Almaden Lake. The lake would be separated from the channel using a series of sheet piles. Creek flows would then be routed behind the sheet piles, allowing draining of Almaden Lake, while enabling creek baseflow and stormwater to pass downstream. In this manner, creek flows would be separated from the remainder of Almaden Lake. Unless properly designed, the sheet piles could result in a temporary constriction of flows of the creek. If a major storm

event were to occur during the Project construction period, the temporary conveyance could be insufficient to pass flows downstream, which could result in accidental release of flows into the Almaden Lake work area, creating potential hazards to Project workers and construction equipment. This would be a significant impact. Implementation of Mitigation Measure 3.K-3 (Final Siting of Sheet Pile System) would minimize this impact to less than significant levels by ensuring that temporary construction period creek water management systems would allow sufficient flows to convey major storm events.

Operations Impacts

Erosion, Siltation, Water Conveyance, and Geomorphology

Operation of the Project would involve conveyance of water along the restored Alamitos Creek channel, as well as management of stormwater in the Project area. Under existing conditions, stormwater in the Project area is primarily managed internally – it is routed, via overland flow or existing drainage structures, into Almaden Lake. Limited areas peripheral to the existing Almaden Lake Park, particularly on its western margin, drain to other portions of the City's stormwater management system. These areas would not be altered by the Project. Stormwater along areas fringing the eastern portions of the updated Almaden Lake would be managed as they are at present – that is, via discharge to the lake. In the western areas of the Project, where the new park area would be located, stormwater would be collected on site and conveyed into either Almaden Lake or the restored Alamitos Creek. As discussed in Section 2.D.1, Project Components, the new land area would be pervious and the new channel would be vegetated and adjacent to the new channel, which would also be vegetated and is meant to serve as a floodplain. Thus, stormwater would not be routed into sensitive or erosion-prone areas, and the potential for erosion, siltation, or sedimentation of the new park area would be less than significant.

Stream channels are subject to constant erosive and depositional forces. For restored or rerouted channel systems, depending on stream channel design, erosion and deposition are commonly managed using riprap or other hard, erosion resistant surfaces. However, these approaches limit potential habitat and flood management benefits that could otherwise be realized. The Project would rely primarily on earthen and vegetative features to manage flows along the restored Alamitos Creek, thereby mimicking natural conditions. Restoration in this manner, however, requires careful consideration of geomorphic processes, to ensure that factors such as sediment input and output from the restored reach are generally balanced, and that restored stream design considers erosive processes, to ensure that erosion does not occur in areas critical to maintaining system stability (for example, by minimizing erosion near the toe of the levees). As discussed in Section 2.D.1, Project Components, Alamitos Creek Channel Restoration, the Project design incorporated the results of a sediment transport study analysis and a bankfull discharge analysis, to ensure that the new creek channel would be stable and would not migrate outside of intended channel areas during storms and flood events and sediment loads within the Project area would be balanced (inputs equal to outputs).Thus, the intensity of in-stream erosion and sedimentation would be less than significant.

Surface Runoff and Drainage System Capacity

During Project operations, stormwater drainage on site would be managed consistent with existing practices, except that drainage from the western flank of what is currently Almaden Lake, and Almaden Lake's existing western shoreline, would be routed into the Alamitos Creek channel, rather than into Almaden Lake. Drainage from the eastern portion of the existing lake would continue to drain into the lake area. A substantial increase in impervious surfaces is not anticipated in these areas, as discussed above; therefore, increases in the volume of stormwater released from the Project site are not anticipated, nor would the capacity of available drainage systems be exceeded, resulting in a less than significant impact.

Impede or Redirect Flood Flows

Under the Project, Almaden Lake would be separated from Alamitos Creek by a levee and short wall. As discussed in Chapter 2, Project Description, the creek alignment would be sized to maintain sufficient capacity to wholly convey approximately 8,250 cfs of flow – that is, the volume of water anticipated during a 100-year storm event. Therefore, 100-year flooding within the Project area but outside of the channel would be avoided. These flows would pass downstream. While the current FEMA map shows the whole of Almaden Lake as inundated during a 100-year event (Figure 3.K-1), upon completion of the Project, FEMA maps would be updated to show the 100-year flood zone as limited to the leveed area, within the Project area.

Under the Project, 100-year flood flows would be conveyed downstream. The immediate downstream sections of the Guadalupe River are designed to convey the 100-year event. However, other sections are currently being designed by the U.S. Army Corps of Engineers to convey the 100-year event and future construction depends on the availability of funds. The design basis used for this downstream area did not include any flood storage associated with Almaden Lake, but instead assumed that all flow passed through Almaden Lake as if constrained to a channel, similar to that proposed under the Project. Therefore, the Project would be consistent with existing flood design, and 100-year flood flows would be safely conveyed by existing, available downstream conveyance. Therefore, operational period impacts associated with the placement of structures that could interfere with flood flows would be less than significant.

Mitigation Measures

> Mitigation Measure 3.K-3: *Final Siting of Sheet Pile System*. Prior to the initiation of construction, the District and/or its contractors shall determine the final siting of the temporary sheet pile system based on a hydrologic assessment during design. The design shall site all sheet piles needed for Project construction to ensure that sufficient capacity would be available in the temporary creek system to convey up to a 100-year storm event (i.e., approximately 8,250 cfs).

Significance after Mitigation: Less than Significant. Compliance with Mitigation Measure 3.K-would ensure that adequate capacity is available in Alamitos Creek to convey major storm events.

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3.L Noise

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to noise and vibration, and includes an analysis of impacts related to noise and vibration from the Project. For the purposes of this assessment, the fundamentals of acoustics and environmental noise, the baseline for determining environmental impacts (including noise measurements presented in Appendix F), the criteria used for determining the significance of environmental impacts, and impacts and appropriate mitigation measures associated with construction, operation, and maintenance are discussed. If needed, District best management practices (BMPs) and mitigation measures to avoid or reduce significant impacts are also identified.

3.L.1 Fundamentals of Acoustics, Environmental Noise, and Vibration

Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). Noise is generally defined as unwanted sound (i.e., loud, unexpected, or annoying sound). Acoustics is defined as the physics of sound. In acoustics, the fundamental scientific model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determine the sound level and characteristics of the noise perceived by the receiver. Acoustics addresses primarily the propagation and control of sound.

Frequency

The number of sound pressure peaks travelling past a given point in a single second is referred to as the frequency, expressed in cycles per second or Hertz (Hz). A given sound may consist of energy at a single frequency (pure tone) or in many frequencies over a broad frequency range (or band). Human hearing is generally affected by sound frequencies between 20 Hz and 20,000 Hz.

Amplitude

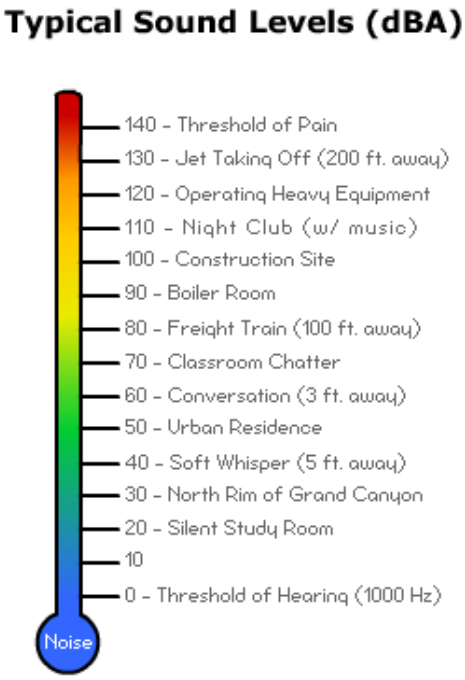
The amplitude of pressure waves generated by a sound source determines the perceived loudness of that source. Sound pressure amplitude is measured in micro-Pascals (µPa). One µPa is approximately one hundred billionths of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 µPa to 100,000,000 µPa. Because of this huge range of values, sound is rarely expressed in terms of pressure. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of human hearing (near total silence) is approximately 0 dB which corresponds to 20 µPa.

Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic means. Under the decibel scale, a doubling of sound energy corresponds to a 3 dB increase. In other words, when two sources are each producing sound of the same loudness, the resulting sound level at a given distance would be approximately 3 dB higher than one of the sources under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB – rather they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level of approximately 5 dB louder than one source, and ten sources of equal loudness together produce a sound level of approximately 10 dB louder than the single source.

A-Weighted Decibels

Figure 3.L-1 illustrates sound levels associated with common sound sources. The perceived loudness of sounds is dependent on many factors, including SPL and frequency content. However, within the usual range of environmental sound levels, perception of loudness is relatively predictable, and can be approximated by frequency filtering using the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard descriptor for environmental noise assessment. All noise levels reported in this section are in terms of A-weighting.



SOURCE: OSHA, 2016

Figure 3.L-1
Decibel Scale and Common Noise Sources

Human Response to Changes in Noise Levels

As discussed above, doubling sound energy results in a 3 dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different than what is measured.

Under controlled conditions in a laboratory setting, the trained, healthy human ear is able to discern 1 dB changes in sound levels when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency range (1,000 Hz–8,000 Hz). In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dB increase is generally perceived as a distinctly noticeable increase, and a 10 dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy that would result in a 3 dB increase in sound pressure level would generally be perceived as barely detectable. Refer to Table 3.L-1 for the approximate relationship between increases in environmental noise level and human perception.

TABLE 3.L-1
APPROXIMATE RELATIONSHIP BETWEEN INCREASES IN ENVIRONMENTAL NOISE LEVEL AND HUMAN PERCEPTION

Noise level increase, dB	Human perception (typical)
up to about 3	not perceptible
about 3	barely perceptible
about 6	distinctly noticeable
about 10	twice as loud
about 20	four times as loud

SOURCE: Caltrans, 2013a.

Noise Descriptors

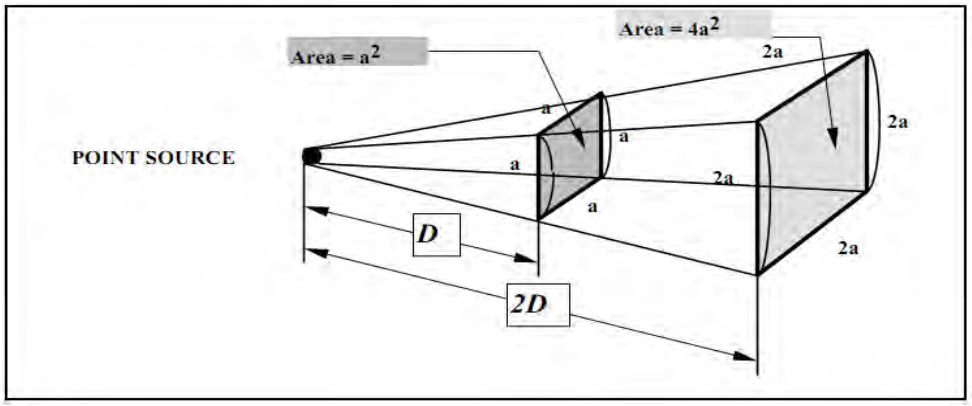
Noise in our daily environments fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in environmental noise analysis, and are applicable to this study:

- Equivalent Sound Level (L_{eq}): The L_{eq} represents an average of the sound energy occurring over a specified time period. In effect, the Leq is the steady-state sound level containing the same acoustical energy as the time-varying sound that occurs during the same period. The 1-hour, A-weighted equivalent sound level (Leq[h]) is the energy average of A-weighted sound levels occurring during a 1-hour period, and used for noise impact determinations by the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA).

- Maximum Sound Level (L_{max}): The Lmax is the highest instantaneous sound level measured during a specified period.
- Day-Night Average Level (DNL): The DNL is the energy-average of A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during nighttime hours (10 p.m.-7 a.m.).

Sound Propagation

Sound from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern; therefore, this type of propagation is called spherical spreading. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point/stationary source as its energy is continuously spread out over a spherical surface (see Figure 3.L-2).



SOURCE: Caltrans, 2013a

Figure 3.L-2
Point Source Propagation (Spherical Spreading)

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal and is typically expressed in units of inches per second (in/sec). The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the affect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to describe RMS. The decibel notation acts to compress the range of numbers required to describe vibration (FTA, 2006). Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration.

3.L.2 Setting

The Project site is located south of the San Francisco Bay within the City of San José, south of State Route 85 (SR 85). The study area includes Almaden Lake and Almaden Lake Park, a 65-acre public access Park. The Park and Almaden Lake support a variety of recreational

activities on the east and west sides of the Park. A portion of the west side of the Park is also considered a wildlife sanctuary. The existing island located in the south-central portion of the lake is closed to public access. The Project area also includes pipeline alignments extending north and south of the Park, and access routes and a staging area to the north of Coleman Road.

Adjacent to the Project site are a variety of land uses which are also included in the study area. North of the Project site is Coleman Road, the residential community of Almaden Lake Village, the Santa Clara Valley Water District (District) Headquarters as well as the Guadalupe River and ~~Los~~ Alamitos Percolation Pond. To the east is Winfield Boulevard, the residential community of Lakeview Terrace, and Almaden Lake Apartments. Directly south of the Park is the Almaden Valley Animal Hospital, the Almaden Valley (Plant) Nursery, Boulder Ridge Golf Club, Almaden Hill Estates, and the ~~Los~~ Alamitos Creek. To the west is the Almaden Expressway and a residential community named the Almaden Villas. The Almaden Villas are separated from the Project site by a five- to six-foot high concrete wall that provides a noise barrier along Almaden Expressway.

Sensitive Receptors

In general, residences, schools, hotels, hospitals, and nursing homes are considered to be the most sensitive to noise. Places such as churches, libraries, and cemeteries, where people tend to pray, study, and/or contemplate, are also sensitive to noise. Commercial and industrial uses are considered the least noise-sensitive.

The sensitive receptors in the immediate vicinity of the Project site are the surrounding residential developments, including Almaden Lake Village to the north of Coleman Road, Lakeview Terrace and Almaden Lake Apartments to the east, Almaden Hills Estate to the south of the Park, and Almaden Villas to the west. There is a senior housing complex called Le Mirador Senior Apartments, located 600 feet northwest of the main Project area. There are no schools identified within 1,000 feet of the main Project area; and although Pioneer High School is located within 700 feet of Alignment 2 of the transfer pipeline to the ~~Los~~ Alamitos Percolation Pond, which runs north along Almaden Expressway, the nearest classroom at the high school is approximately 2,000 feet from Alignment 2. The residences at Almaden Lake Village would be as close as approximately 200 feet from on-site activities at the lake, and within 30 feet of the truck access route to/from the Alamitos Creek Trail. The transfer pipeline to the ~~Los~~ Alamitos Percolation Pond would be located as close as 100 feet from residences along the west side of Almaden Expressway, and the transfer pipeline from the Almaden Valley Pipeline would be located as close as approximately 30 feet to residences along McAbee Road ~~Crossview Circle~~.

Existing Ambient Noise Conditions

Noise sources around the Project site include a variety of birds, distant overhead aircraft, vehicles on adjacent roadways, and voices of nearby residents. To quantify the existing ambient noise environment in the Project vicinity, short-term (15-minute) ambient noise level

measurements were conducted at locations to the north, west, and east of the Project site. Figure 3.L-3 shows the ambient noise level measurement locations (sites). These sites were chosen to best represent the ambient noise environments at the closest noise-sensitive uses to the Project site. Due to similar environments, Noise Monitoring Locations 3 and 4 also represent existing conditions at residences south-southwest of the Project site near Almaden Expressway and south-southeast of Almaden Lake near the Almaden Valley Pipeline Alignment, respectively. Table 3.L-2 presents the ambient noise measurement results.



Figure 3.L-3
Noise Level Measurement Locations

TABLE 3.L-2
SUMMARY OF AMBIENT NOISE LEVEL MEASUREMENT RESULTS

Monitoring Location	Description of Monitoring Location	Monitoring Results (dBA)	
		L_{eq}	L_{max}
1	Northwest corner of Almaden Lake Village off of Coleman Road.	52.0	67.8
2	Behind Le Mirador Senior Apartments near the intersection of Almaden Expressway and Coleman Road.	55.4	78.7
3	Empty lot adjacent to Porto Alegre Court and Almaden Expressway.	71.8	79.7
4	Terrace View Drive off of Winfield Boulevard.	59.2	76.4

NOTES: dBA = A-weighted decibels. Measurements were short-term, collected over 15-minute periods on Friday, September 9, 2016, between 10:30 a.m. to 1:00 p.m.

SOURCE: Appendix F.

Short-term, daytime ambient noise level measurements were completed on Friday, September 9, 2016, between 10:30 a.m. and 1:00 p.m. Atmospheric conditions during the measurement session included daytime temperatures in the low to mid 70s °F, average winds were three to six miles per hour (mph) and the relative humidity was between 49 percent to 57 percent.

Ambient noise level measurements were completed using a Metrosonics, Inc. db-308 sound level meter equipped with a ½-inch outdoor microphone. The measurement system represents Type 2 (Class 2) instrumentation. The meter was calibrated immediately prior to the start of the survey using a Metrosonics, Inc. Model DL304 calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute (ANSI) for Type 2 sound level meters (ANSI S1.4). Based on the monitoring results, the highest noise levels were from vehicles on Almaden Expressway at location #3 in an empty lot adjacent to Porto Alegre Court and Almaden Expressway west of the Project site at the Almaden Villas development. Conversely, the lowest noise levels were present at location #1 in the northwest corner of Almaden Lake Village off of Coleman Road.

In addition to short-term noise measurements, baseline daytime traffic noise levels were calculated for Winfield Boulevard and Coleman Road, the two roadways that would be most impacted by the Project's construction-related traffic. The traffic noise levels were calculated using algorithms from the Federal Highway Administration (FHWA)'s Traffic Noise Model Technical Manual and baseline traffic volume data obtained from the Project Transportation Report (Fehr and Peers, 2016). Table 3.L-3 presents the estimated ambient daytime traffic noise levels at 60 feet and 100 feet from the centerline of these roadways, respectively, to the nearest residential receptor.

TABLE 3.L-3
EXISTING TRAFFIC NOISE LEVELS MODELED FOR AREA ROADWAYS

Roadway Near Project	Daytime L_{eq} dBA (8:00 a.m. – 5:00 p.m.)
Winfield Boulevard	58.1
Coleman Road	62.4

NOTES: dBA = A-weighted decibels. Based on traffic measurements collected Thursday, June 2, 2016.

SOURCE: Appendix F.

3.L.3 Regulatory Setting

The Project falls under the jurisdiction of many local, state, and federal agencies with respect to specific aspects of planning, construction, restoration, and management. A summary of applicable key laws, regulations, and policies related to noise and vibration is presented below.

Federal Regulations

Occupational Safety and Health Act

Under the Occupational Safety and Health Act of 1970 (29 USC §651 et seq.), the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) adopted regulations (29 CFR §1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list limits on noise exposure levels as a function of the amount of time during which the worker is exposed (see Table 3.L-4). The regulations further specify requirements for a hearing conservation program (§1910.95(c)), a monitoring program (§1910.95(d)), an audiometric testing program (§1910.95(g)), and hearing protection §1910.95(i)). There are no federal laws governing community noise.

TABLE 3.L-4
OSHA-PERMISSIBLE NOISE EXPOSURE STANDARDS FOR WORKERS

Duration of Noise (hours/day)	A-Weighted Noise Level (dBA)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115

SOURCE: OSHA, 1974.

Although no federal community noise regulations exist, the U.S. EPA has promulgated noise guidelines. The U.S. EPA guideline recommends a DNL of 55 dB or less to protect the public from the effects of broadband environmental noise outdoors in residential areas and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use (U.S. EPA, 1974).

Federal Transit Administration Guidelines

The Federal Transit Administration (FTA) has issued guidance on how to assess noise impacts from construction related activities in its Transit Noise and Vibration Impact Assessment report (FTA, 2006). FTA's guidance is designed to be used by project sponsors seeking to evaluate noise and vibration impacts during the environmental review process. While the document focuses primarily on operation of transportation projects, it also provides guidance on the use of heavy machinery and associated sound levels during construction, including the types of equipment that would be deployed under the Project. FTA's guidance also describes a range of measures for controlling excessive noise and vibration.

State Regulations

California Government Code §65302 encourages each local government entity to implement a noise element as part of its general plan. In addition, the California Governor's Office of Planning and Research has developed guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. Furthermore, the California Occupational Safety and Health Administration (Cal/OSHA) has promulgated Occupational Noise Exposure Regulations (Title 8 CCR §5096) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards described above.

Local Policies

Envision San José 2040 General Plan

The following are goals and policies of City of San José's *Envision San José 2040 General Plan* (General Plan) that may be applicable to the project (City of San José, 2018).

Goal EC-1.1: Community Noise Levels and Land Use Compatibility

Policy EC-1.7. Require construction equipment/operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code (Section 20.100.450). The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

- Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

Goal EC-2: Vibration. Minimize vibration impacts on people, residences, and business operations.

Policy EC-2.3. Require new development to minimize vibration impacts to adjacent uses during demolition and construction. A vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction.

City of San José Municipal Code

The City of San José Municipal Code establishes noise exposure limits for stationary noise sources (non-transportation sources) and specifies hours for project construction (City of San José, 2016):

Sections 20.20.300, 20.30.700, 20.40,600, and 20.50.300. These sections of the City's Municipal Code establish performance standards for noise exposure associated with stationary/non-transportation sources at the property line of noise-sensitive uses. Specifically, noise exposure is limited to 55 dB, 60 dB, and 70 dB at the property line of residential, commercial, and industrial receivers. Although the Code is not explicit with respect to the acoustical descriptor assigned to these noise levels, it is a reasonable interpretation that these levels may be applied to an hourly average noise level (Hourly Leq). This assumption is consistent with other jurisdictions in the Bay Area and northern California.

Section 20.100.450. Hours of construction within 500 feet of a residential unit

A. Unless otherwise expressly allowed in a development permit or other planning approval, no applicant or agent of an applicant shall suffer or allow any construction activity on a site located within 500 feet of a residential unit before 7 a.m. or after 7 p.m., Monday thru Friday, or at any time on weekends.

B. Without limiting the scope of Section 20.100.310, no applicant or agent of an applicant shall suffer or allow any construction activity on a site subject to a development permit or other planning approval located within 500 feet of a residential unit at any time when that activity is not allowed under the development permit or planning approval.

C. This section is applicable whenever a development permit or other planning approval is required for construction activity.

3.L.4 Impacts and Mitigation Measures

Significance Criteria

Implementation of the Project would have a significant impact relating to noise or vibration if it would result in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generation of excessive groundborne vibration or groundborne noise levels;
- For a project located within the vicinity of a private airstrip or an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, where the project would expose people residing or working in the area to excessive noise levels.

Approach to Analysis

This section addresses noise and vibration impacts associated with construction and operation of the Project with regard to potential effects on noise-sensitive receptors, and identifies mitigation measures necessary to reduce the intensity of significant impacts.

The following analysis approach is applied to determine the level of impact associated with the Project.

Project Construction Equipment Noise and Vibration (Short-term)

The City does not offer, as part of its Noise Element of the General Plan or Municipal Code, any quantitative criteria for the determination of construction noise impacts at neighboring noise-sensitive uses. The City considers significant construction noise impacts requiring heavy machinery for more than 12 months (continuous) to be significant at residential uses within 500 feet and commercial uses within 200 feet of the construction. As described in Section 3.L.2, there are residences within 500 feet to the north, east, and west of the Project site and there are commercial uses within 200 feet to the south of the Project site. To determine whether the Project would result in an environmental noise impact in terms of generating a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project, construction-related noise levels were evaluated relative to the FTA's construction noise assessment criteria, which has identified a daytime hourly L_{eq} of 90 dBA as a noise level from on-site construction activities where adverse community reaction could occur (FTA, 2006).

In accordance with General Plan Policy EC-2.3, Project construction vibration exposure at neighboring acoustically sensitive uses would be considered significant if it would exceed 0.20 in/sec PPV. This criterion is considered at locations where Project construction requires the operation of heavy, vibration-causing equipment (e.g., pile driving).

Project Construction Traffic Noise Levels (Short-term)

Project construction-related traffic noise exposure increases were assessed using traffic volume data from the Project Transportation Report (Fehr and Peers, 2016) and the Santa Clara County Official Road Book (Santa Clara County, 2016). Baseline and Baseline plus Project traffic volumes were used to derive respective daytime average noise levels. The City does not have a quantitative threshold of significance for short-term noise levels related to traffic noise. However, as discussed in Section 3.L.1, a 10 dB increase is generally perceived as twice as loud. Therefore, the District has determined that construction-related traffic noise increases of greater than 10 dB would be considered a significant impact to nearby residences.

Project Operational Noise and Exposure to Noise-sensitive Receptors (Long-term)

As established in the City's Municipal Code, project-related operational noise exposure exceeding 55 dB DNL at the property line at residential uses and 60 dB DNL at the property line at commercial uses in the Project vicinity would be considered significant. Noise exposure in excess of this threshold would not satisfy the City's determination of land-use compatibility or noise exposure quality. Therefore, this criterion is considered to be an appropriate threshold for Project-related operational noise impacts.

No Impact Significance Determinations

Based on the nature of the Project, there would be no impact related to the following criterion:

> *Be located within the vicinity of a private airstrip or an airport land use plan area, within 2 miles of a public or public use airport, or in the vicinity of a private airstrip, wherein it would expose people to excessive noise levels.* The closest

airport to the Project site is the Norman Y. Mineta San José International Airport, which is located 7.5 miles north of the Project site. The second closest airport, the Moffett Field, is located 14 miles northwest of the Project site. There are no private airstrips located within the vicinity of the Project. As such, the Project site is not located within the vicinity of a private airstrip or an airport land use plan area, or within 2 miles of a public or public use airport. Therefore, the and Project would not be affected by aircraft noise or other operations; no impact would occur, and this criterion is not analyzed further.

Impact Summary

Table 3.L-5 provides a summary of noise and vibration impacts by implementation phase (construction and operations).

TABLE 3.L-5
SUMMARY OF NOISE AND VIBRATION IMPACTS

Impact Statement	Construction	Operation
Impact 3.L-1: The Project would generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	LSM	LS~~M~~
Impact 3.L-2: Project-related construction would not generate excessive vibration and groundborne noise exposure in the Project vicinity.	LS	LS

LS = Less than significant
LSM = Less than significant with mitigation

Impacts and Mitigation Measures

Impact 3.L-1: The Project would generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. (Less than Significant with Mitigation)

Construction

As discussed in the Approach to Analysis section above, the City does not have quantitative criteria for assessing construction noise impacts at neighboring noise-sensitive uses. The City's General Plan establishes that residential uses within 500 feet of construction, and commercial uses within 200 feet of construction, may be adversely affected by construction noise. Existing residences on the northern, western, and eastern sides of the Project site would be located within 500 feet of construction activities; therefore, these residences could be significantly affected by Project-related construction noise. Adherence to Section 20.100.450 of the City's Municipal Code would ensure that Project construction would be limited to daytime hours (7 a.m. to 7 p.m.) on weekdays within 500 feet of residences, unless otherwise expressly allowed in a development permit or other planning approval, such as for potential Saturday construction activities (each phase of the Project would occur within 500 feet of residential uses).

To comply with the intent of General Plan Policy EC-1.7, the District and/or its contractors should develop and adhere to a Construction Noise Logistics Plan. If such a plan were not to

be developed and implemented, the Project would be considered inconsistent with Policy EC-1.7 and the associated impact would be significant.

Implementation of Mitigation Measure 3.L-1~~a~~ (Construction Noise Logistics Plan) would be required, and would ensure that the Project would be consistent with the City's applicable standards, ordinances, and the General Plan. With the development and implementation of a Noise Logistic Plan as required by Mitigation Measure 3.L-1~~a~~ the Project would be consistent with Policy EC-1.7 and other applicable local standard, and this impact would be less that significant with mitigation.

The following analysis was conducted to determine whether the Project would generate a substantial temporary increase in ambient noise levels in the vicinity of the Project that would exceed recommendations of other applicable agencies. Although there are no applicable local policies or standards to judge the significance of short-term daytime construction noise levels in the City of San José, the District has decided to utilize the FTA's construction noise assessment criteria, which has identified a daytime hourly L_{eq} of 90 dB as a noise level from on-site construction activities where adverse community reaction could occur (FTA, 2006).

Noise production from construction equipment varies greatly depending on factors including the specific equipment being used (including model, age, and condition), the number of pieces of equipment being used concurrently, and the activity being performed. Noise associated with heavy equipment using diesel engines often dominates the noise environment in the vicinity of a construction site. Stationary sources such as generators and pumps may also produce a significant contribution. Table 3.L-6 provides a list of construction equipment that would be utilized under the Project, and the typical noise levels associated with that equipment. As discussed previously, L_{max} refers to the maximum noise generated by a piece of equipment operating at full power at a given distance (here, 50 feet). However, to account for variability in operating power and activity from the equipment used by the Project, the L_{eq} at 50 feet descriptor is also provided.

Noise levels from all construction phases of the Project were quantified using the L_{eq} values from Table 3.L-6 to determine the loudest exposure to nearby residences, as shown in Table 3.L-7.

Construction activities at the Almaden Lake site would occur as close as 200 feet to 450 feet to the nearest residences. At these distances, the maximum noise exposure is estimated to range from 58 dBA to 73 dBA L_{eq}. This sound intensity would be below the FTA hourly L_{eq} of 90 dB limit for where adverse community reaction could occur. The loudest noise exposure at residences would be associated with construction of the transfer pipeline that would connect Almaden Lake to the Almaden Valley Pipeline as well as repaving and revegetation activities that would be required after the pipeline is installed, because some residences along McAbee Road ~~Crossview Court~~ would be as close as approximately 30 feet to these activities. The noise exposure level at these residences would be up to 89 dBA as shown in Table 3.L-7. Construction activities associated with the transfer pipeline from Almaden Lake to the ~~Los~~ Alamitos Percolation/Los Capitancillos Ponds would occur as close as 100 feet to the nearest residences, which would be exposed to noise levels as high as 77 dBA L_{eq}. The

maximum duration of construction activity in the vicinity of any one sensitive receptor associated with these pipeline components is expected to be approximately 2 weeks. These sound intensities would be below the FTA threshold for construction noise and the impact from construction noise would be less than significant.

TABLE 3.L-6
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Exposure Level, dB L_{max} @ 50 Feet[1]	Noise Exposure Level, dB L_{eq} @ 50 Feet[2]
Compactor	83	76
Concrete Mixer Truck	79	75
Concrete Saw	90	83
Crane	81	73
Dozer	82	78
Excavator	81	77
Generator	81	78
Grader	85	81
Water Truck	79	75
Loader	79	75
Pump	81	78
Paver	77	74
Plate Compactor	83	76
Roller	80	73
Soil Mix Drill Rig	80	77
Vibratory Pile Driver	101	94

NOTES: 1. L_{max} is the highest instantaneous sound level measured during a specified period.
2. L_{eq} represents an average of the sound energy occurring over a specified time period and reflect equipment-specific usage rates.

SOURCES: FTA, 2006; FWHA, 2008.

With respect to traffic noise level increases associated with construction-related traffic, Table 3.L-3 presented the baseline daytime Leq for the residences nearest to Winfield Boulevard and Coleman Road (for segments both south and north of Almaden Lake Village), the three roadway segments that would be most impacted by the Project's construction-related traffic. As discussed in Section 2.E.3, Summary of Construction Equipment/Crews/ Duration, construction activities would typically occur between the hours of 7 a.m. and 7 p.m., Monday through Friday. Construction activities could also occur on Saturdays from 8 a.m. to 5 p.m., if permitted by the City. However, for the purpose of considering traffic noise impacts, this analysis considers the potential for all Project-related daily truck and automobile trips to occur between the hours of 8 a.m. to 5 p.m. In addition, the traffic noise modeling assumes that all worker and truck trips would occur along one of these road segments, so the modelled noise for each road segment represents a worst-case scenario for that road.

TABLE 3.L-7
ANTICIPATED CONSTRUCTION PERIOD NOISE LEVELS AT SENSITIVE RECEPTOR LOCATIONS

Construction Activity	Nearest Sensitive Receptor Distance (feet)	Noise Exposure Level (dBA L_{eq}) at Nearest Sensitive Receptor
Activities at Almaden Lake		
Creek Diversion, Lake Draining, Cofferdam Installation	400	71.6
Levee Foundation and Soil Cement	200	73.3
Working Surface Vegetation / Debris Removal	250	66.7
Expanded and New Islands Construction	450	62.7
Clay Cap for Lake and Levee Foundation Area	250	66.1
Alamitos Creek West Bank Shore Grading	400	60.1
New Park Area Construction	300	64.1
Dewatering	300	58.4
Pipeline-related Activities		
Transfer Pipeline from Almaden Valley Pipeline	30-50*	88.7
Repaving and/or Revegetation	30	85.7
Transfer Pipeline to ~~Los~~ Alamitos Percolation Pond	100-120*	76.5

* Pipeline construction activities would occur as a linear spread of equipment. When closest to residences, it is anticipated that the five modeled pieces of equipment would be spread along the Transfer Pipeline from Almaden Valley Pipeline construction corridor at distances that would range from 30 feet to 50 feet and along the Transfer Pipeline to ~~Los~~ Alamitos Percolation Pond at distances that would range from 100 feet to 120 feet.

SOURCE: Appendix F.

Table 3.L-8 presents the ambient and the "Plus Project" L_{eq} daytime noise levels as well as the noise increase for these residential receptors for the time period when the Project's peak construction-related traffic would occur. A 10 dB increase is generally perceived as a doubling of noise and has been used as a determinant of significance for construction-related traffic. If all Project construction traffic would access the site via the Guadalupe River Trail from Coleman Road, north of Almaden Lake Village, the temporarily increase in the L_{eq} daytime traffic noise levels at Almaden Lake Village would be 18.1 dBA, which would exceed the increase over ambient threshold of 10 dBA. This segment of Coleman Road is currently used to access a park and ride lot and the Almaden Lake Village complex; and is occasionally used by City maintenance vehicles. If all Project construction traffic would access the site via Winfield Boulevard, south of Coleman Road, the temporarily increase in the L_{eq} daytime traffic noise levels at adjacent residences would be 10.3 dBA, which would exceed the increase over ambient threshold of 10 dBA. If all of the Project construction traffic would access the site via Coleman Road, south of Almaden Lake Village, the temporarily increase in the L_{eq} daytime noise levels adjacent to Coleman Road, south of Almaden Lake Village would be 4.2 dBA, which would be less than the increase over ambient threshold of 10 dBA. Refer to Appendix F for the construction equipment and traffic noise calculations used to estimate these values.

TABLE 3.L-8
BASELINE PLUS PROJECT DAYTIME EQUIVALENT NOISE LEVELS FOR RESIDENCES NEAREST TO AFFECTED PROJECT ROADWAYS

Roadway Near Project	L_{eq} Daytime Baseline dBA (8:00 a.m. - 5:00 p.m.)	L_{eq} Daytime Baseline Plus Project dBA (8:00 a.m. - 5:00 p.m.)	dBA Increase from Project
Coleman Road (south of Almaden Lake Village)	62.4	66.6	4.2
Coleman Road (north of Almaden Lake Village)	52.0*	70.1**	18.1
Winfield Boulevard	58.1	68.4	10.3

NOTES: dBA = A-weighted decibels.

* The ambient noise level at Coleman Road (north of Almaden Village) was measured (see Table 3.L-2). The other ambient noise levels in this table were estimated using algorithms from the Federal Highway Administration (FHWA)'s Traffic Noise Model Technical Manual and baseline traffic volume data obtained from the Project Transportation Report (Fehr and Peers, 2016).

** Represents peak-hour noise levels when construction workers would commute to/from the site.

SOURCE: ESA, 2019.

Because construction of the Project would exceed the applicable threshold criteria associated with off-site traffic if all Project construction traffic would access the site via the Guadalupe River Trail from Coleman Road, north of Almaden Lake Village, or from Winfield Boulevard, south of Coleman Road, the impact from construction traffic is considered significant.

Implementation of Mitigation Measure 3.L-1~~a~~ would ensure that this impact would be reduced by restricting all Project-related construction traffic to the site via the Guadalupe River Trail to worker vehicles only (i.e., no haul truck access), and by restricting hourly truck trips along Winfield Boulevard, south of Coleman Road, to no more than 70 trips per hour. Implementation of Mitigation Measure 3.L-1~~a~~ would reduce the peak-hour traffic noise increase at the north side of Alameda Lake Village to approximately 1.9 dBA, and would reduce the daytime noise increase at residences adjacent to Winfield Boulevard, south of Coleman Road, to approximately 9.7 dBA. With implementation of Mitigation Measure 3.L-1~~a~~ construction traffic on each of the roadway segments would be reduced to under the 10 dB threshold and the impact would be less than significant with mitigation.

Operation

The applicable significance thresholds for Project-related operational noise exposure is 55 dB DNL at residential uses and 60 dBA DNL at commercial uses in the Project vicinity. The Project includes ~~two~~ a pump station ~~options~~ for moving water from the lake to the pipeline connecting to ~~Los~~ Alamitos Pond. The pump station would be housed within a deeply buried structure, with the electrical housing above grade. ~~One would be a pump submerged within the lake waters~~, Earth between the pump structure and surface ~~which~~ would provide sound insulation and dissipate pump noise below the operational noise threshold for residential uses of 55 dB DNL threshold. Noise impacts from use of the pump station would be less than significant.

~~However, noise from the Project's potential above ground water pump station along the northern end of the lake would generate a DNL of 61 dBA for the closest receptors at the residences in Almaden Lake Village.[1] This value is based on a pump reference noise level of 78 dBA at 50 feet, a combined noise level for two pumps at 81 dBA, continuous operation of the pumps during a 24-hour period, and pump usage factors of 50 percent. The DNL of 61 dBA exceeds the operational noise threshold for residential uses, and is therefore considered a significant impact related to a substantial, permanent increase in ambient noise levels in the Project vicinity.~~

~~To reduce the noise emitted by the water pump station, the Project would be required to implement Mitigation Measure 3.L-1b (Install a Fully Enclosed Pump Station) which requires the installation of an enclosure to house and fully enclose the pump station to reduce pump noise. To determine a conservative estimate for the noise level reduction achieved by the installation of the pump enclosure, FHWA noise reduction figures were considered. The FHWA has established that building noise reduction factors can account for a noise level reduction from 20 dB to 35 dB ranging from a light frame building with ordinary closed windows to a masonry building with double glazed closed windows, respectively (FHWA, 2011). Although the above-referenced fully-enclosed pump house would likely provide a greater noise level reduction, a conservative 10 dBA reduction was applied. Therefore, adherence to Mitigation Measure 3.L-1b would reduce noise levels from the pump station to a DNL of 51 dB, ensuring that operational noise from the Project would be below the 55 dB DNL threshold at the nearest residence, thereby minimizing and reducing operational noise impacts to less than significant. Refer to Appendix F for the detailed noise calculations and methods use to derive the pump station noise levels.~~

Other operation period activities would be limited to the use of light-duty trucks and other small equipment or tools for ongoing maintenance activities. These activities would not cause substantial noise, and would occur intermittently.

Baseline noise levels without the Project were also evaluated for Coleman Road, which is the road that separates the nearest sensitive receptors from the Project's operational noise source. The ambient DNL for this road at the residential property line was estimated at 63 dBA, which is greater than the Project's estimated mitigated operational noise level. In addition, based on analysis provided in Section 3.O, Transportation, Project operation would not result in an increase in traffic in the Project area, and as discussed above, would not otherwise increase noise levels relative to existing conditions, including at the nearest residential receptors. Noise impacts from maintenance vehicles would be less than significant.

Mitigation Measures

Mitigation Measure 3.L-1~~a~~: *Construction Noise Logistics Plan*. The District and/or its contractors shall develop and adhere to a Construction Noise Logistics Plan, in accordance with General Plan Policy EC-1.7. The Plan will specify hours of

~~[1] The nearest sensitive receptors to the pump station would be the residences at Almaden Lake Village approximately 430 feet away.~~

construction, noise and vibration minimization measures (e.g., use of exhaust mufflers, use of and hydraulically or electrically powered equipment, and use of noise shields, blankets, and/or enclosures), provide for / require posting and notification of residences within 500 feet of the construction site of construction schedules, and designate a noise disturbance coordinator to respond to neighborhood complaints during construction. The noise disturbance coordinator shall ensure that the Plan is implemented, and shall be available to respond to complaints during all construction work hours. All construction activities conducted within 500 feet of a residence shall be completed between the hours of 7:00 a.m. and 7:00 p.m., on weekdays; or Saturdays if permitted by the City. The Plan shall include a provision restricting all Project-related construction traffic to the site via the Guadalupe River Trail north of Almaden Lake Village to worker vehicles only (i.e., no haul truck access) and a provision restricting hourly truck trips along Winfield Boulevard, south of Coleman Road, to no more than 70 trips per hour.

~~Mitigation Measure 3.L-1b: *Install a Fully Enclosed Pump Station*. The District and/or its construction contractors shall be required to fully enclose the pumps at the pump station, to reduce operational noise levels. The enclosure shall fully cover all pumps, and shall be sufficient to reduce noise levels to 55 dB or lower at each residence within 500 feet of the Project site.~~

Impact Significance after Mitigation: Less than Significant. Mitigation Measure 3.L-1~~a~~ would require the District to develop a Construction Noise Logistics Plan specifying the hours of construction, restricting construction traffic to designated areas, and establishing a noise disturbance coordinator to fully comply with the local noise ordinance and policies and to ensure that noise from construction traffic does create an increase of 10dBA or greater. ~~Mitigation Measure 3.L-1b would ensure that noise from the pump station is less than 55 dB at adjacent residences.~~

Impact 3.L-2: Project-related construction would not generate excessive vibration and groundborne noise exposure in the Project vicinity. (Less than Significant)

Construction Impacts

Construction-related vibration exposure at neighboring acoustically sensitive uses would be considered significant if it would exceed a threshold value of 0.20 in/sec PPV. Project pile driving would occur a minimum of 160 feet from the nearest building structure, as discussed in Chapter 2, Project Description, the Project would deploy vibratory pile driving, rather than impact pile driving. However, in a conservative evaluation, even the use of a large impact pile driver using 80,000 foot-pound of force, and operating at distance of 160 feet from the nearest building, vibration levels would be approximately 0.13 in/sec (Caltrans, 2013b). This vibration level would be distinctly to strongly perceptible at 160 feet from the pile driver, but would be nonetheless well below the applicable threshold of 0.2 in/sec. Based on testing and associated information compiled by Caltrans (2013b), the expected vibration levels of 0.13 in/sec, occurring as frequent, intermittent events as the pile driver operates, would not be strong enough to cause damage to typical historic buildings, residential structures, or

industrial/commercial buildings. Use of vibratory pile driving, rather than impact pile driving would generate substantially less groundborne vibration.

Other equipment used on site could also cause groundborne vibration. For example, large bulldozers and semi-trucks would be used across the site during the construction process. However, vibration associated with operation of these types of equipment are limited. Conservatively assuming a minimum distance of 25 feet (actual distance would be at least 50 feet) from the area of operation of a bulldozer or large, loaded semi-truck to an existing building, a large bulldozer would result in a vibration level of 0.089 in/sec, while a loaded semi-truck would result in a vibration level of 0.076 in/sec. These amounts are well under the threshold of 0.2 in/sec, and would not be expected to cause damage to nearby buildings or other features.

Therefore, nearby receptors would not be exposed to generation of excessive groundborne vibration or groundborne noise levels during construction. Impacts related to this criterion would be less than significant. Nonetheless, the District may use vibratory pile drivers for cofferdam installation, rather than the impact pile driver considered above.

Operation Impacts

Project operation would include ongoing operation of a water pump station, as well as occasional light truck trips during Project maintenance. These activities would not generate perceptible groundborne vibration or groundborne noise. Therefore, Project operation impacts associated with groundborne vibration and groundborne noise would be less than significant.

Mitigation Measures

None required.

3.L.5 References

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U.S. Environmental Protection Agency (U.S. EPA), 1974, Title 29 CFR §1910.95, Table G-16.

3.M Public Services

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to public services, and includes an analysis of impacts to those resources from the Project. For the purposes of this assessment, public services include fire protection, law enforcement, schools, parks, and other public facilities in the City of San José. If needed, District best management practices (BMPs) and measures to avoid or reduce significant impacts are also identified.

3.M.1 Environmental Setting

Almaden Lake is located within and surrounded by Almaden Lake Park (Park), which is located in Santa Clara County, in the southern portion of the City of San José (City). The Project area includes Almaden Lake and Almaden Lake Park, Winfield Warehouse, the District's headquarter site, and a pipeline corridor south of the lake along McAbee Road ~~in the vicinity of the Los Alamitos Creek Trail~~ for construction activities.

Fire Protection

The San José Fire Department (SJFD) provides fire protection services to the Project vicinity. The SJFD serves the City and other Santa Clara County areas with a total population that exceeds 1 million. The SJFD responds to approximately 74,000 calls for service each year from 33 fire stations and is a high-volume, high-performance, full-service fire department. The SJFD is the emergency service provider for a number of high-hazard occupancies, including an international airport, a municipal airport, 7 major hospitals, the SAP Center (indoor arena), San José State University, three super regional malls, and 516 high-rise structures (City of San José, 2015a). The nearest fire station is San José Fire Department Station 17, located approximately 0.75 mile northwest of the Project site on Blossom Hill Road (City of San José, 2015c).

Law Enforcement

The San José Police Department (SJPD) provides law enforcement services to the Project vicinity. The SJPD is administered by a command staff including the Chief, Assistant Chief, and four Deputy Chiefs, presiding over an Operations Command divided into four Bureaus. SJPD is authorized to employ approximately 1,400 employees including both sworn and non-sworn. Department employees are assigned to one of four Bureaus comprised of 11 divisions with more than 50 specialized units and assignments (SJPD, 2015).

Schools

The Project site is located within the San José Unified School District (SJUSD), which operates 41 schools. There are 25 elementary schools, two K-8 schools, six middle schools, six high schools, and two alternative education programs. The SJUSD serves more than 32,000 students in grades PreK-12 (SJUSD, 2015). The closest school to the Project site is Pioneer High School, located 0.62 mile northwest of the Project site (SJUSD, 2014).

Parks

Almaden Lake Park supports a variety of recreational activities including pedal-boating, picnicking, hiking, bocce ball, horseshoes, dog walking, biking, basketball, and volleyball. Recreational facilities include playgrounds, picnic areas, bocce courts, paved trails, a beach area on the west shore of the lake, and an amphitheater near the southeast shore of the lake. The San José Parks, Recreation, and Neighborhood Services Department oversees operations at Almaden Lake Park in cooperation with the Santa Clara Valley Water District. The San José Parks, Recreation, and Neighborhood Services Department is responsible for parks and other recreational facilities within San José (City of San José, 2015b). See Section 3.N, Recreation, for further information on recreational resources located near the Project site.

Other Public Facilities

Other public facilities in the Project's vicinity include the Vineland Branch Library, located 1.03 miles west of the Project site (San José Public Library, 2015). Nearby medical facilities include the Samaritan Medical Care Center, located 1.95 miles northeast of the Project site, and Almaden Family Physicians, located 1.5 miles southeast of the Project site (CEP America, 2015; Stanford Health Care, 2015).

3.M.2 Regulatory Setting

Federal Regulations

There are no federal regulations governing public services that apply to the Almaden Lake Improvement Project.

State Regulations

California Master Mutual Aid Agreement

The California Master Mutual Aid Agreement is a framework agreement between the State of California and local governments that provides for aid and assistance through the interchange of services and facilities. This aid agreement includes but is not limited to the following: fire, police, medical and health, communication, and transportation services, as well as facilities to cope with issues related to rescue, relief, evacuation, rehabilitation, and reconstruction.

California Occupational Safety and Health Administration

In accordance with the California Code of Regulations, Title 8, Sections 1270 ("Fire Prevention") and 6773 ("Fire Protection and Fire Equipment"), California Occupational Safety and Health Administration (OSHA) has established minimum standards for fire suppression and emergency medical services. The standards include, but are not limited to, guidelines on the handling of highly combustible materials, requirements for the sizing of fire hoses, restrictions on the use of compressed air, access roads, and the testing, maintenance, and use of all firefighting and emergency medical equipment.

Local Regulations

There are no local regulations that pertain to the assessment of Project effects on public services.

3.M.3 Impacts and Mitigation Measures

Significance Criteria

The Project would result in significant effects related to public services if it would:

> Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

i) Fire protection

ii) Police protection

iii) Schools

iv) Parks

v) Other public facilities

Approach to Analysis

Methods used to assess impacts on public services included site visits to the Project area in May 2016, and review of local planning documents and maps to identify the proximity of public services to the Project site that could be directly or indirectly affected by the Project. Project-related construction and operations activities were assessed for their potential to result in direct adverse impacts on public services given the proximity of the identified public service, and the impact the Project could have on the public service.

No Impact Significance Determinations

Based on the nature of the Project, there would be no impact related to the following criterion:

> *Development of the proposed Project would not result in an increase in new students for local schools, nor would it require new or physically altered school facilities to maintain acceptable performance objectives.* The Project would not result in neighborhood population growth or residential housing that would increase the school-aged population in the Project area. Therefore, there would be no impact to local schools.

Impact Summary

Table 3.M-1 provides a summary of public services impacts by implementation phase (construction and operations).

TABLE 3.M-1
SUMMARY OF PUBLIC SERVICES IMPACTS

Impact Statement	Construction	Operation
Impact 3.M-1: Development of the proposed Project could result in an increase in calls for fire protection, police services and emergency medical response services, but would not require new or physically altered fire or police facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable performance objectives.	LS	LS
Impact 3.M-2: Development of the proposed Project could result in an increase in the use of existing neighborhood and regional parks and recreation centers, but not to the extent that substantial physical deterioration of the facilities would occur or be accelerated, nor would it cause the necessity for new or expanded facilities.	LS	LS

LS = Less than significant

Impacts and Mitigation Measures

Impact 3.M-1: Development of the proposed Project could result in an increase in calls for fire protection, police services and emergency medical response services, but would not require new or physically altered fire or police facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable performance objectives. (Less than Significant)

Construction Impacts

During construction, emergency services would be provided by the City of San José and its reciprocal partners, if needed. Construction activity is not expected to require a substantial increase in the need for emergency service providers, because the number of construction workers on site at a given time would be limited (up to 48 construction workers in overlapping construction phases anticipated at any given time). Additionally, the construction area would be entirely fenced with security fencing during construction, ensuring that access to the construction site by the public would be restricted. Because Project construction would not substantially increase demand for emergency services, it would also not meaningfully contribute to or result in a need for new or physically altered fire or police facilities. Therefore, construction impacts related to demand for fire, police, and medical response services and facilities would be less than significant.

Operations Impacts

During operation, the updated lake area would provide similar recreation functions as are available under existing conditions. The Project area would be re-opened for public use following construction, and would be expected to draw a similar number of people for similar activities to those of current conditions. Security lighting would not be required beyond what is already present in the Park. Therefore, long-term operation and maintenance of the Project area is not expected to substantially alter or increase demand for emergency services or facilities, in comparison to that of existing conditions. Therefore, this impact is considered less than significant.

Mitigation Measures

None required.

Impact 3.M-2: Development of the proposed Project could result in an increase in the use of existing neighborhood and regional parks and recreation centers, but not to the extent that substantial physical deterioration of the facilities would occur or be accelerated, nor would it cause the necessity for new or expanded facilities. (Less than Significant)

Construction Impacts

Detailed analysis of the recreational effects can be found in Section 3.N, Recreation. This section focuses on the impacts to nearby parks. Almaden Lake Park would be impacted by the temporary closure of parts of the Park during the approximately 30-month construction period. Construction of the following Project elements would temporarily affect existing use of the Almaden Lake Park: relocation of the boat house and boat launch; and expansion of the open Park area into the existing west beach and its adjacent open water area. Temporary construction fencing would be installed along the perimeter of the work area in order to restrict access to the construction area. Construction fencing would bound the anticipated disturbance area, from the southern end of Alamitos Creek, running south along the western bank of Alamitos Creek, south to the construction access point at Winfield Boulevard, and around the remaining lake areas. Installation of the Almaden Valley Pipeline connection would temporarily disrupt access to a portion~~s~~ of the Los Alamitos Creek Trail immediately upstream of the lake.

Construction of the Almaden Lake improvements would result in a temporary restriction of access to the beach along the western edge of the lake, the boat house and launch, and the existing picnic area, either entirely or in phases during construction. While public access to the western edge of the lake is closed during construction, Park goers would have access to the north shoreline and the east entrance that would not be under construction. The disruption would be temporary, with construction activities starting as early as summer 2022 ~~2021~~, with an approximate duration of 30 months. The disruption may temporarily increase use of nearby parks within the Project vicinity that provide similar recreational opportunities as Almaden Lake Park, including Almaden Quicksilver County Park (5 miles south of Project site), Santa Teresa County Park (5.5 miles southeast of the Project site), and Oak Grove Park (0.44 mile west of the Project site). Within the Project vicinity, there would be sufficient park alternatives such that no single other park would be used to replace Park uses temporarily affected by Project construction. Also, any temporary, construction-related increases in use of nearby parks would be consistent with existing uses of these areas for recreation, but with a slightly higher intensity. Because the anticipated increase in park use would be temporary, similar in nature to existing use categories, and distributed across other nearby parks, the Project is not anticipated to significantly increase use of other parks, such that their facilities would be degraded, or such that new or expanded facilities would be required. Therefore, this impact is considered less than significant.

Operations Impacts

Operational activities associated with the Project would include the continuation of existing and ongoing maintenance activities at Almaden Lake as well as new activities such as routine vegetation management and structural maintenance activities for the levee, road and trail, creek channel, and the lake. Details on maintenance activities are provided in Chapter 2, Project Description. Detailed analysis of the recreational effects can be found in Section 3.N, Recreation. The majority of the maintenance activities are currently ongoing at the Project site.

New maintenance activities could result in temporary closures of trails or the maintenance road, when maintenance is required. Closure of trails or the maintenance road would be temporary and would not be expected to occur over more than a few weeks at any given location. Because there are multiple access points to the Park, and the impact on use of the Park during maintenance activities would be temporary and would not substantially deter Park users, maintenance activities would not substantially increase use of nearby parks or trails such that deterioration of park facilities would result. Therefore, this impact would be less than significant.

The Project would result in several operational improvements to the Park. The levee would be utilized as both a road for District and Park maintenance vehicles and as a pedestrian pathway. The pedestrian pathway would connect with the existing Guadalupe River Trail at the north end of the lake and with the existing Los Alamitos Creek Trail at the south end of the lake. A pedestrian trail would be added to the top of the berm between the open area on the west side of the Park and Alamitos Creek.The existing launch ramp and boat house would be relocated, and the open park area along the western shore of the lake would be expanded. These long-term improvements to the Park would support improved recreation opportunities at the Project site, and could slightly increase use of the Almaden Lake Park, in comparison to existing conditions. However, any potential increase is expected to be limited, and would be within existing and design standards for the Park. Therefore, the Project would not result in a substantial increase in use of the Park or of existing neighborhood and regional parks or recreation centers to the extent that would accelerate their physical deterioration or require new or expanded facilities, and this impact would be less than significant.

Mitigation Measures

None required.

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3.N Recreation

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to recreation, and includes analysis of impacts to such resources from the Project. For the purposes of this assessment, recreational resources include parks and open space in the Project vicinity. If needed, District best management practices (BMPs) and mitigation measures to avoid or reduce significant impacts are also identified.

3.N.1 Environmental Setting

The City of San José (City) features 54 miles of trails in 27 trail systems and provides nearly 200 parks (City of San José, 2011). The City's Parks, Recreation, and Neighborhood Services Department is responsible for parks and other recreational facilities within San José (City of San José, 2015d), including operation of Almaden Lake Park (Park) in cooperation with the Santa Clara Valley Water District (District).

Recreational Facilities

Almaden Lake Park

Almaden Lake Park is a 65-acre facility managed by the City of San José with 32 acres of lake featuring many recreational opportunities, including pedal boating, picnicking, wildlife viewing, walking/running, biking, volleyball, horseshoes, bocce ball, and dog walking. Recreational facilities include playgrounds, picnic areas, bocce courts, paved trails, a beach area on the west shore of the lake, and a 75-seat amphitheater near the southeast shore of the lake (Figure 3.N-1). To support public access to the Park, two parking lots are located in the Park, one on the northwest and another on the southeast side of the Park, with restrooms adjacent to each (City of San José, 2015a, 2015c). The City is responsible for managing recreational uses at Almaden Lake such as swimming, fishing, pedal boating, picnicking, non-motorized biking, and hiking activities in accordance with all applicable legal and permitting requirements. Due to water quality concerns, the City has closed Almaden Lake to swimming since August 2010. The City allows fishing in Almaden Lake, but signage posted by the City indicates consumption of fish is not recommended.

Almaden Lake Park is divided into two sides referred to as the Eastside, which runs parallel to Winfield Boulevard, and the Westside of the Park along Almaden Expressway. A concession stand is open on a seasonal basis, and offers food and beverages (City of San José, 2015b). There are large green open lawns and picnic areas with barbeque pits. Tot lots are located at both sides of the Park and feature water play areas. However, the water feature is currently turned off due to the drought, and swimming is not permitted (City of San José, 2015c).

Paved trails within the Park include the Almaden Lake Trail adjacent to the eastern lake shore and the Oak Hill Trail along the southern end of the Park. Both trails connect to the regional trail network. In addition to supporting a variety of recreational activities, the Park also includes an existing island located in the south-central portion of the lake that supports bird populations, although no public access is provided to the island.



SOURCE: City of San José, ESA

Almaden Lake Improvement Project . 130679

Figure 3.N-1

Almaden Lake Park Recreation Features

Santa Teresa County Park

Santa Teresa County Park is a 1,627-acre park located in the Santa Teresa Hills approximately 5.5 miles southeast of the Project site. Santa Teresa County Park offers a variety of recreational opportunities, including the Santa Teresa Golf Club, a clubhouse with a restaurant and pro shop, and a banquet facility. There is a picnic area with a large barbeque pit, the historic Bernal-Gulnac-Joice Ranch and Santa Teresa Springs, an archery range, and the Pueblo Day Use area that includes parking and an equestrian staging area (Santa Clara County, 2016). The Los Alamitos Creek Trail runs between Almaden Lake Park and Santa Teresa County Park.

Almaden Quicksilver County Park

Almaden Quicksilver County Park is a 4,163-acre park occupying the majority of Capitancillos Ridge approximately 5 miles south of the Project site. Almaden Quicksilver County Park is the site of over 135 years of mining activities and the former home to more than 1,800 miners and their families. The park includes over 37 miles of hiking trails, including 30 miles of equestrian trails and about 17 miles of biking trails. All trails in the park are open to on-leash dog walking. Almaden Quicksilver County Park has picnic tables scattered throughout the park adjacent to the trails (Santa Clara County, 2018). The historic New Almaden Quicksilver Mines are in Almaden Quicksilver County Park, and are the source of the mercury accumulating in Almaden Lake.

Oak Grove Park

Approximately 0.44 mile west of the Project site is Guadalupe Oak Grove Park, a 63-acre park dominated by an old oak forest, located in the Almaden Valley area of San José. The park is predominantly used for hiking, walking, running, picnicking, and bird and wildlife watching, with biking allowed on the flatland trails (WayMarking, 2016).

Boulder Ridge Golf Club

The Boulder Ridge Golf Club is a 300-acre property located southeast of the Project site. The Boulder Ridge Golf Club is located above Santa Clara Valley in San José, offering views of the Silicon Valley and the Santa Cruz Mountain Range. The Pavilion Event Center provides space for ceremonies and receptions (The Golf Club at Boulder Ridge, 2016).

Existing Recreation Opportunities

As noted above, the Park provides a broad range of recreational opportunities. Following is an inventory of such opportunities in 2017.

The Park includes seven picnic areas for reservation by fee (see Table 3.N-1). The Park also has three open-use picnic areas available on a first come, first served basis: North Shoreline (Eastside), Greystone (Eastside), and Willow (Westside) (Figure 3.N-1).

Active recreational opportunities include two horseshoe pits, two bocce ball courts, volleyball area, and two playgrounds (i.e., tot-lots). The playgrounds include water play features, although they have not been operated recently due to drought concerns.

TABLE 3.N-1
ALMADEN LAKE PICNIC AREAS

Picnic Site	Location	Capacity	Amenities
Arroyo	Eastside	200	2 large barbeques 4 small barbeques 20 tables 2 sinks 2 prep tables
Cinnabar I & II	Westside	180	7 barbeques 18 tables
Lakeview	Westside	40	1 medium barbeque 4 tables
Peppertree[a]	Westside	60	1 large barbeque 6 tables
Quicksilver	Eastside	190	1 large barbeque 19 tables
South Point	Eastside	190	2 barbeques 19 tables
Tamien	Westside	60	1 large barbeque 6 tables

[a] The Ohlone picnic area (reservable) is adjacent to Peppertree picnic area, though it is not identified on the City's list.

Recreational opportunities for dogs and their owners are limited to the Eastside of the Park. Leash laws apply at the Park. Dogs are not allowed on the Westside of the Park.

Due primarily to poor water quality conditions in the lake, swimming and boating are currently prohibited. However, on-site pedal boat rentals have been available on a seasonal basis. Two boat launch ramps are found on the lake's north and east shores, but they are not for public use. A sand beach area is located on the lake's west shore.

Almaden Lake Trail circles the lake. It is a level paved bi-directional trail intended for pedestrians and bicyclists. In the areas of more intense uses (e.g., lawn/picnic areas), the trail is incorporated into the sidewalk network. In the southern corner of the Park, Oak Hill Trail accesses an undeveloped portion of the Park and is available for pedestrian use only. To the south, Almaden Lake Trail connects with Los Alamitos Creek Trail, which continues 3.9 miles south along Alamitos Creek to Santa Teresa County Park. At the northern Park border, Almaden Lake Trail passes under Coleman Avenue and connects to the Guadalupe River Trail. A more detailed discussion of these regional trails follows.

Recreational Trails

Los Alamitos Creek Trail

Los Alamitos Creek Trail is a paved, 4.7-mile long multi-use path that begins at Almaden Lake and heads south, following the banks of the creek. Initially the trail skirts some housing developments before crossing the creek and running parallel to Camden Avenue. The trail eventually leaves the road and follows Calero and Santa Teresa Creeks, ending at Fortini

Road and Santa Teresa County Park. The trail is open to hikers, walkers, joggers, dogs, and horses. The trail features a trailside parcourse station, a beach, some picnic areas, and a park. Cyclists can use Los Alamitos Creek Trail as a route to Santa Teresa County Park and Almaden Quicksilver County Park (Bay Area Hiker, 2001).

Guadalupe River Trail

The northern segment of the Guadalupe River Trail runs from the Bay in Alviso beneath most roadways, including under State Route 237, US Highway 101, and Interstate 880, as it makes its way past San José International Airport, past the San José Pavilion and through downtown San José to end at Virginia Street, just south of Interstate 280. The northern section passes through the 250-acre Guadalupe River Park and Garden. The southern segment of the Guadalupe River Trail extends from Chynoweth Avenue and follows the river south to Almaden Lake Park (TrailLink, 2016).

3.N.2 Regulatory Setting

There are no federal, state, or local regulations governing recreational resources that are applicable to the Project.

3.N.3 Impacts and Mitigation Measures

Significance Criteria

Implementation of the Project would have a significant impact on recreation resources if it were to:

- Result in the loss of recreational opportunities that would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated;
- Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

Approach to Analysis

The Project's potential to result in impacts related to recreation is analyzed qualitatively, based upon familiarity with the Project area, site visits, and a review of aerial photographs and recreation maps prepared by planning agencies within the affected jurisdiction. The evaluation of Project impact on recreational facilities in the Project area to avoid or mitigate an environmental effect or to protect the environment is based on the proximity of recreational opportunities and facilities to the siting, construction, and operation of the Project facilities.

The Project includes the reconfiguration of Almaden Lake, which is used for pedal boating, wildlife viewing and fishing. In addition, the Project includes construction of a new maintenance road/public trail, new open Park area (replacing existing beach area), and relocation of the existing boat ramp and boat house. Finally, construction of the Project

would include temporary closure of portions of Project area trails, picnic areas, lawn areas, and amphitheater, all of which would be returned to conditions similar to existing at the end of Project construction. Although not required to address indirect impacts on the visitor experience during construction, it is noted that mitigation measures under Sections 3.C, Air Quality, and 3.L, Noise, would reduce air quality and noise impacts during construction, and would therefore diminish the effect of construction activities on recreational resources.

The analysis in this section is focused on the physical impacts of the Project on recreational resources beyond those that are directly included as part of the Project Description.

Impact Summary

Table 3.N-2 provides a summary of recreation impacts by implementation phase (construction and operations).

TABLE 3.N-2
SUMMARY OF RECREATION IMPACTS

Impact Statement	Construction	Operation
Impact 3.N-1: The Project would not result in the loss of recreational opportunities that would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS	LS
Impact 3.N-2: The Project would not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment	LS	LS

LS = Less than significant

Impacts and Mitigation Measures

Impact 3.N-1: The Project would not result in the loss of recreational opportunities that could increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. (Less than Significant)

Construction Impacts

Construction of the Project would occur within Almaden Lake Park, in the vicinity of Los Alamitos Creek Trail to the south of the Park, along Almaden Expressway north of the Park, and would include a construction access point immediately downstream of the Coleman Road Bridge at the Guadalupe River East Bank Trail by the Santa Clara Valley Transportation Authority Almaden Light Rail Station (Figure 2-2, in Chapter 2, Project Description). Project construction would result in temporary closures to several existing recreational facilities during the approximately 30-month construction period. During this period, temporary closures within the Park would include: the boat rental and boat launch; up to six reservable picnic areas; three open-use picnic areas; segments of Almaden Lake Trail, Los Alamitos Creek Trail immediately upstream of the lake, and Guadalupe River East Bank Trail; the beach and

adjacent open area; and the amphitheater. Temporary construction fencing would be installed along the perimeter of the work area and lake to restrict access to active construction and staging areas and reduce the visual intrusion of construction activities on the visitor experience. Construction fencing would encircle the lake and include additional areas along the Westside and along the Eastside from Alamitos Creek on the south to the construction access point off Winfield Boulevard.

On the Westside, construction would result in a temporary restriction of access to the boat rental and launch, Lakeview, Peppertree, and Tamien picnic areas, the Willow and Ohlone open-use picnic areas, the beach and adjacent open lawn area, and portions of Almaden Lake Trail entirely or in phases. The area of closure would be less on the Eastside, but still affect several amenities, including the Arroyo, Southpoint, and Quicksilver picnic areas, the amphitheater, portions of Almaden Lake Trail, and potentially a portion of the Greystone open-use picnic area (Figure 3.N-1). While public access to these areas would be restricted during construction, visitors would continue to have access to the north shoreline, bocce courts, playgrounds, remaining picnic areas, horseshoe pits, volleyball, all restrooms, and some parking.

It is anticipated that no substantial change would be made to Almaden Lake Trail during construction, although minor grade modifications would be made to 150 feet of the trail at the north end of the lake to match the finished grade of the levee. Portions of Oak Hill Trail near the intersection with Almaden Lake Trail would be temporarily closed during grading work in the area. During the temporary closure of trails, trail users would be redirected to maintain connection with the Los Alamitos Creek and Guadalupe River trails. Signage and fencing would inform and redirect trail users around the restricted areas. Construction of the Almaden Valley Pipeline alignment and use of the Guadalupe River East Bank Trail as a construction access point would result in temporary closures of segments of these trails. To the extent possible, trail closure would be phased according to the construction schedule.

Construction activities could temporarily close six of the Park's seven reservable picnic sites (Lakeview, Peppertree, Tamien, Arroyo, Southpoint, and Quicksilver) with a combined capacity of up to 920, plus amenities such as barbeques, entirely or in phases. The Greystone, Willow, and Ohlone open-use picnic areas would also be wholly or partially closed during this time. With these closures, one reservable picnic area (Cinnabar I & II) serving a capacity of 180, plus amenities, and the North Shore open-use picnic area would remain open (Figure 3.N-1).

The temporary disruption caused by construction would be expected to increase the use of nearby parks or other recreational facilities within the Project area vicinity (e.g., Santa Teresa County Park, Oak Grove Park). However, to the extent feasible and possible, closure of the amenities and recreation opportunities at Almaden Lake Park would be phased during the 30-month construction period; therefore, it is not expected that all amenities or opportunities would be unavailable for the entire construction period. Given the availability of nearby Park facilities (i.e., within five miles, and as described above in the Setting section), it would be expected that no one park alternative would replace all uses temporarily displaced at

Almaden Lake Park, such that substantial physical deterioration of alternate facilities would occur or be accelerated. Therefore, impacts on other parks or recreational facilities during Project construction would be less than significant.

Operations Impacts

Operational activities associated with the Project would include the continuation of existing and ongoing maintenance activities and existing recreational use at the Park, as well as new activities such as routine vegetation management and structural maintenance activities for the levee, road and trail, creek channel, and lake. Details on maintenance activities are provided in Chapter 2, Project Description. The majority of the maintenance activities would be similar to those currently occurring at the Project site. The Project would not change existing recreational uses of the Park. The City would continue to be responsible for managing recreational uses at Almaden Lake, such as swimming, fishing, pedal boating, picnicking, non-motorized biking, and hiking activities.

New maintenance activities would result in temporary closures of trails or the maintenance road on an as-needed basis. These closures would not be expected to occur over more than a few weeks at any given location. Because there are multiple trails and paths in the Park providing alternate routes and given the temporary nature of maintenance, this impact would be less than significant.

The Project would result in several permanent operational improvements to the Park. The levee would be utilized as both a road for District and Park maintenance vehicles, and as a pedestrian pathway. This pathway would connect with the existing Guadalupe River Trail beyond the north end of the lake and with the existing Los Alamitos Creek Trail at the south end of the lake. The berm separating the new open space on the west side of the Park from Alamitos Creek would be used as a pedestrian trail on the west side of the creek. The existing boat launch ramp and boat house would be relocated to the southeastern area of the reconfigured lake. Pedal boating would continue at the Park operating out of the boat house. The open park area along the western shore of the lake would be expanded. The open park area expansion would convert the sandy beach to an open grassy area, changing the recreational use of this area. These long-term improvements to the Park would not result in an increase in the use of existing neighborhood and regional parks or recreational facilities, as the temporarily displaced uses would return to this Park. Therefore, this impact would be less than significant.

Mitigation Measures

None required.

Impact 3.N-2: The Project would not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. (Less than Significant)

The temporary disruption caused by construction would be expected to increase the use of nearby parks or other recreational facilities within the Project area vicinity (e.g., Santa Teresa County Park, Oak Grove Park). Given the availability of nearby Park facilities (i.e., within five miles, and as described above in the Setting section), there would not be a need to expand or construct recreational facilities during construction. Therefore, impacts from expansion or construction of recreational facilities during Project construction would be less than significant.

The Project would result in several permanent operational improvements to the Park including a new levee trail connecting the Guadalupe River Trail with the Los Alamitos Creek Trail and expanded open park area along the western shore of the lake. These long-term improvements to the Park are not anticipated to result in increased use of the Park. Therefore, this impact would be less than significant.

The impacts of construction of new recreation facilities, the construction disturbance and replacement of existing facilities, and operation of new recreation facilities, is the subject of this EIR. For instance, the construction impacts associated with the new recreation facilities and disturbance and replacement of existing facilities are analyzed separately in applicable sections of this document including: Section 3.C, Air Quality; Section 3.I, Greenhouse Gas Emissions; Section 3.L, Noise; and Section 3.O, Transportation.

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3.O Transportation

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to transportation, and includes an analysis of impacts to those resources from the Project. For the purposes of this assessment, the transportation analysis includes effects of construction-generated traffic on traffic flow on area roadways (autos, transit, and emergency vehicles), and traffic hazards. If needed, District best management practices (BMPs) and mitigation measures to avoid or reduce significant impacts are also identified.

3.O.1 Environmental Setting

This environmental setting is based on existing available information from state, regional, and local transportation management agencies, as well as site specific data collected for this Project (Fehr & Peers, 2016). The transportation study area is generally defined based on the expected haul routes for the construction truck traffic and commute routes by construction workers. In general, State Route (SR) 85 and SR 87 would be used by trucks to haul material, and by construction workers to commute on local roads to access the project site.

Regional Setting

State Route 85 (SR 85) is a freeway that passes through Silicon Valley, wrapping around San José, connecting Mountain View in the west with South San José in the east. Located north of the Project site, SR 85 has two mixed-flow lanes and one High-Occupancy Vehicle (HOV) lane in each direction. The HOV lanes operate on weekdays from 5:00-9:00 AM and 3:00-7:00 PM for carpool vehicles (i.e., vehicles with two or more persons) and eligible clean air vehicles; outside of those hours, the HOV lanes can be used by all vehicles. Trucks over 9,000 pounds gross vehicle weight are prohibited on the 18.4-mile stretch of SR 85 from US 101 in San José to Interstate 280 in Cupertino. SR 85 connects to the local street network that provides direct access to the Project site via the SR 85 /Almaden Expressway interchange.

State Route 87 (SR 87) is a divided freeway that connects SR 85 to U.S. Highway 101. SR 87 has two mixed-flow lanes and one HOV lane in each direction. The HOV lanes operate on weekdays from 5:00-9:00 AM and 3:00-7:00 PM for carpool vehicles (i.e., vehicles with two or more persons) and eligible clean air vehicles; outside of those hours, the HOV lanes can be used by all vehicles. SR 87 terminates at its southern end at the SR 85 / Santa Teresa Boulevard / SR 87 interchange; Santa Teresa Boulevard provides access from SR 87 to the Project site.

Local Setting

Almaden Expressway is a north-south divided expressway (part of County Route G8, and designated as an “Other Principal Arterial) with four to eight lanes that begins at Harry Road in South San José and transitions into Almaden Road just north of SR 87. Access to Almaden Expressway is limited to major intersections controlled by signals (i.e., no driveways), though there is an exception to this near SR 85 and Blossom Hill Road where

several commercial and shopping centers have direct driveway access to Almaden Expressway. The Almaden Lake Park has a right-in/right-out driveway on Almaden Expressway approximately 650 feet south of Coleman Road.

Coleman Road is an east-west Minor Arterial that extends from Camden Avenue to Santa Teresa Boulevard. Coleman Road between Camden Avenue and Redmond Avenue has a single lane in each direction, and widens to two lanes in each direction between Redmond Avenue and Santa Teresa Boulevard.

Winfield Boulevard is a north-south Minor Arterial that extends from Almaden Expressway to Chynoweth Avenue. Adjacent to Almaden Lake Park, Winfield Boulevard has two lanes in each direction, and north of Coleman Road, the roadway transitions into one lane in each direction, with a center left turn lane.

Santa Teresa Boulevard is an east-west roadway that extends from Scheller Avenue to SR 87. Santa Teresa Boulevard is classified as a Minor Arterial between Scheller Avenue and Bailey Avenue and between Blossom Hill Road and SR 87; it is classified as a Principal Arterial between Bailey Avenue and Blossom Hill Road. There are three lanes in each direction between SR 87 and Bayliss Drive and one lane in each direction between Bayliss Drive and Scheller Avenue.

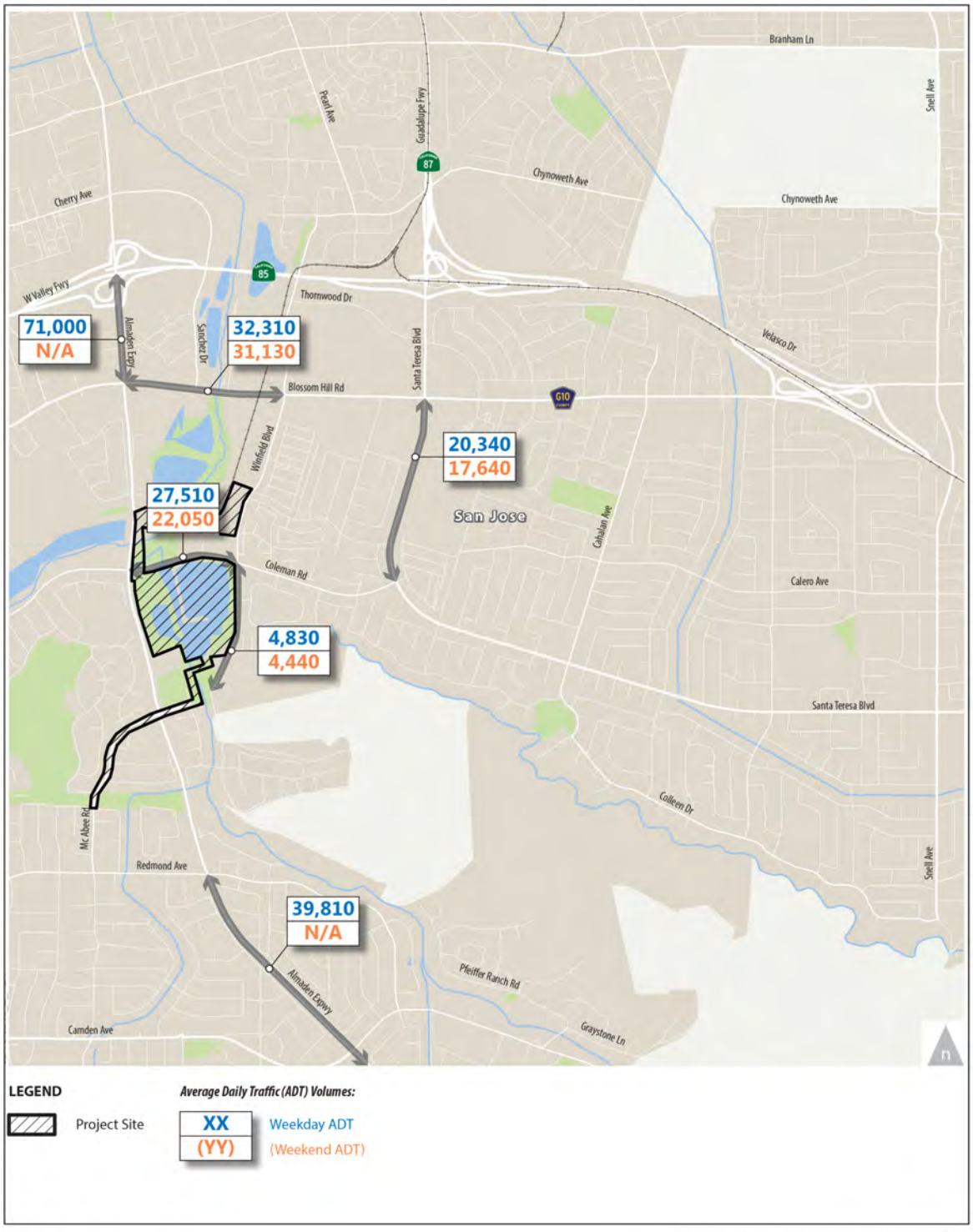
Blossom Hill Road is an east-west Principal Arterial that extends from North Santa Cruz Avenue in the west to the Montgomery Road overpass in the east. Blossom Hill Road is part of County Road G10. Near the Project site, the road provides three lanes in each direction, with a center raised median.

McAbee Road is a north-south roadway that extends from Almaden Quicksilver County Park to Almaden Expressway. There are two lanes in each direction in the study area, with a center raised median and turn lanes.

Existing Traffic Volumes

Table 3.O-1 and Figure 3.O-1 display the existing daily roadway segment volumes (weekday and weekend). Roadway segment volumes were collected June 2 through June 4, 2016 (Thursday through Saturday), except for Almaden Expressway, which is a County-maintained expressway. The County encourages use of traffic volumes in the Santa Clara County Road Book to maintain consistent information across traffic studies; the County collects weekday volumes only. The most recent count information on Almaden Expressway is from 2017 for both study segments (between SR 85 and Blossom Hill Road, and between Redmond Avenue and Via Valiente).

Daily Level of Service (LOS) grades shown in Table 3.O-1 were assigned to the study area roadways using planning-level volume/capacity guidance developed by the Florida Department of Transportation (FDOT) that considers the speed, number of travel lanes, and the type of traffic control (i.e., interrupted or uninterrupted flow), (FDOT, 2012). The FDOT guidance is considered to be an industry standard that is used nationwide for general planning applications.



SOURCE: Fehr and Peers

Almaden Lake Improvement Project . 130679

Figure 3.O-1 (Revised)
Roadway Network and
Daily Traffic Volumes

TABLE 3.O-1
EXISTING DAILY TRAFFIC VOLUMES ON AREA ROADWAYS

Road Segment	Classification	Number of Travel Lanes	Weekday Volume	LOS[1]	Weekend Volume	LOS[1]
Almaden Expressway: SR 85 to Blossom Hill Road	Expressway	6	73,920	F	N/A	N/A
Almaden Expressway: Redmond Avenue to Via Valiente	Expressway	4	34,840	C	N/A	N/A
Coleman Road: Almaden Expressway to Winfield Boulevard	Minor Arterial	4	27,510	C	22,050	C
Winfield Boulevard: South of Coleman Road	Minor Arterial	4	4,830	C	4,440	C
Santa Teresa Boulevard: Blossom Hill Road to Coleman Road	Principal Arterial	6	20,340	C	17,640	C
Blossom Hill Road: Almaden Expressway to Winfield Boulevard	Principal Arterial	6	32,310	C	31,130	C

NOTES:

N/A = not available

[1] The FDOT guidance only provides volume thresholds corresponding to LOS C or worse conditions on signalized interrupted flow facilities. Therefore, locations identified as operating at LOS C in this table may actually operate better than LOS C (i.e., LOS A or LOS B.

SOURCES: Santa Clara County Roads and Airports (Almaden Expressway volumes), 2017; FDOT; and Fehr & Peers (June 2 through June 4, 2016)

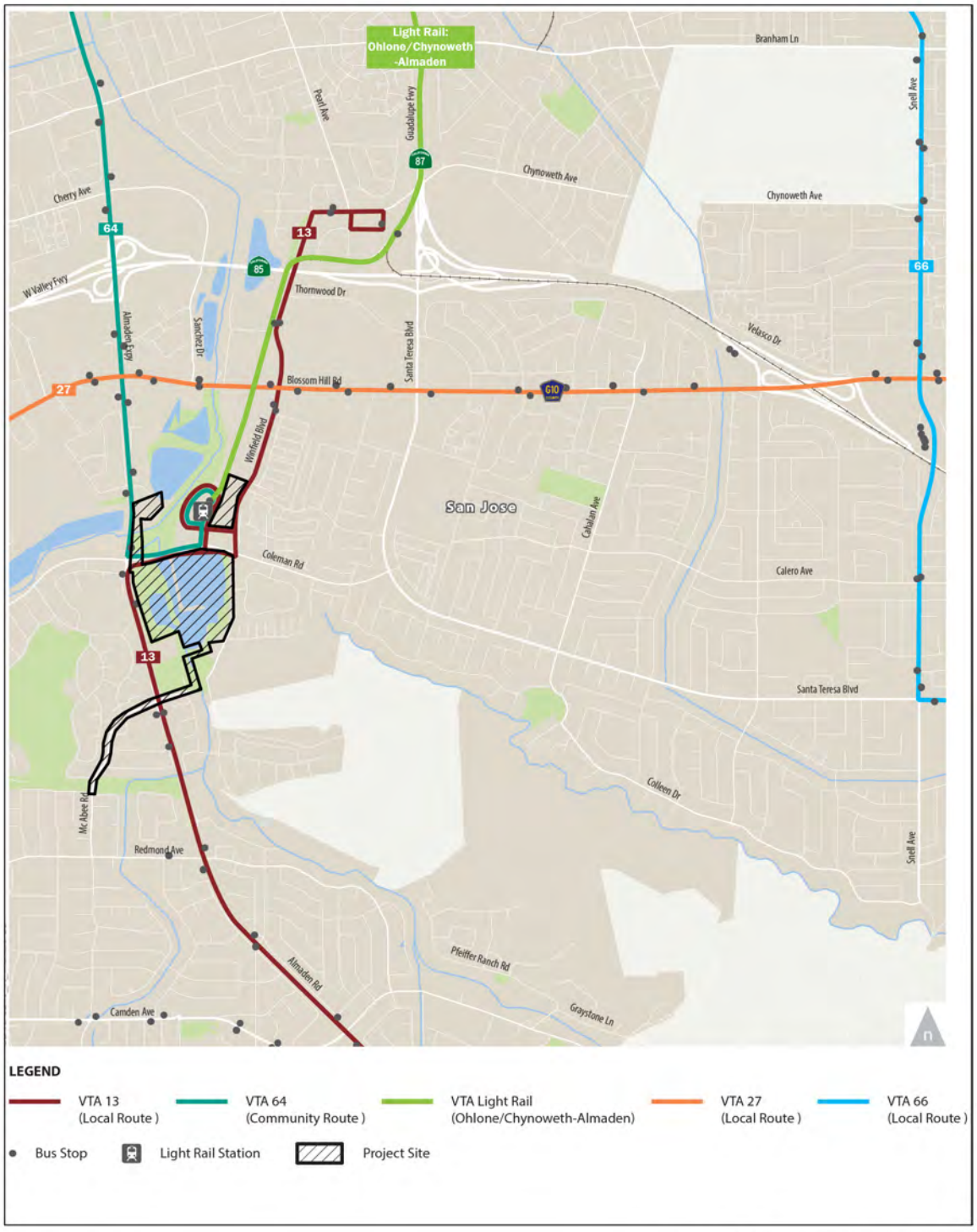
Transit Service

The Santa Clara Valley Transportation Authority (VTA) provides light rail, bus and paratransit service to Santa Clara County, including the City of San José. Light rail trains operate at frequencies of 15 to 60 minutes, depending on the time of day. VTA bus routes generally operate between 5:00 AM and 1:00 AM on weekdays and 6:00 AM and 12:30 AM on weekends. Transit services that operate on, and cross, roadways within the Project study area are displayed on Figure 3.O-2.

Bicycle Facilities

Bikeway planning and design in California typically relies on guidelines and design standards established by Caltrans, with bikeways consisting of paths (Class I), lanes (Class II), and routes (Class III).

- *Class I Bikeway (Bicycle Path)* provides a completely separate right-of-way and is designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian cross-flow minimized. In general, bike paths serve corridors not served by streets and highways or where sufficient right-of-way exists to allow such facilities to be constructed away from the influence of parallel streets and vehicle conflict.



SOURCE: Fehr and Peers

Almaden Lake Improvement Project . 130679

Figure 3.O-2 (Revised)
Existing Transit Facilities

- *Class II Bikeway (Bicycle Lane)* provides a restricted right-of-way generally adjacent to the outer vehicle travel lane and is designated for the use of bicycles. These lanes have special lane markings, pavement legends, and signage. Bicycle lanes are generally four to six feet wide. Adjacent vehicle parking and vehicle/pedestrian cross-flow are permitted.
- *Class III Bikeway (Bicycle Route)* are designated by signs or pavement markings (sharrows) for shared use with pedestrians or motor vehicles but have no separated bike right-of-way or lane striping. Sharrows are a type of pavement marking (bike and arrow stencil) placed to guide bicyclists to the best place to ride on the road, avoid car doors, and remind drivers to share the road with cyclists. Bike routes serve either to: a) provide continuity to other bicycle facilities, or b) designate preferred routes through high demand corridors.

Existing facilities in the study area are displayed on Figure 3.O-3. There are Class II bike lanes adjacent to the Park on Almaden Expressway. North of the Project site, bike lanes are provided along both sides of Coleman Road. To the northeast and southwest of the project site, bike lanes are provided on both sides of McAbee Road and Winfield Boulevard. There are several Class I trails around the Project site: Los Alamitos Creek Trail, Almaden Lake Trail, and Guadalupe Creek Trail.

Pedestrian Facilities

Pedestrian facilities consist of sidewalks, crosswalks, and pedestrian signals at signalized intersections. The pedestrian environment was evaluated along the connecting roadways that directly serve the Project site and adjacent roadways that connect to transit stations and/or nearby destinations in the greater study area. Pedestrian connectivity in the vicinity of the Project site is provided by an almost complete network of sidewalks and crosswalks that serve the adjacent Almaden and Alamitos neighborhoods. In addition, there are pedestrian trails throughout Almaden Lake Park.

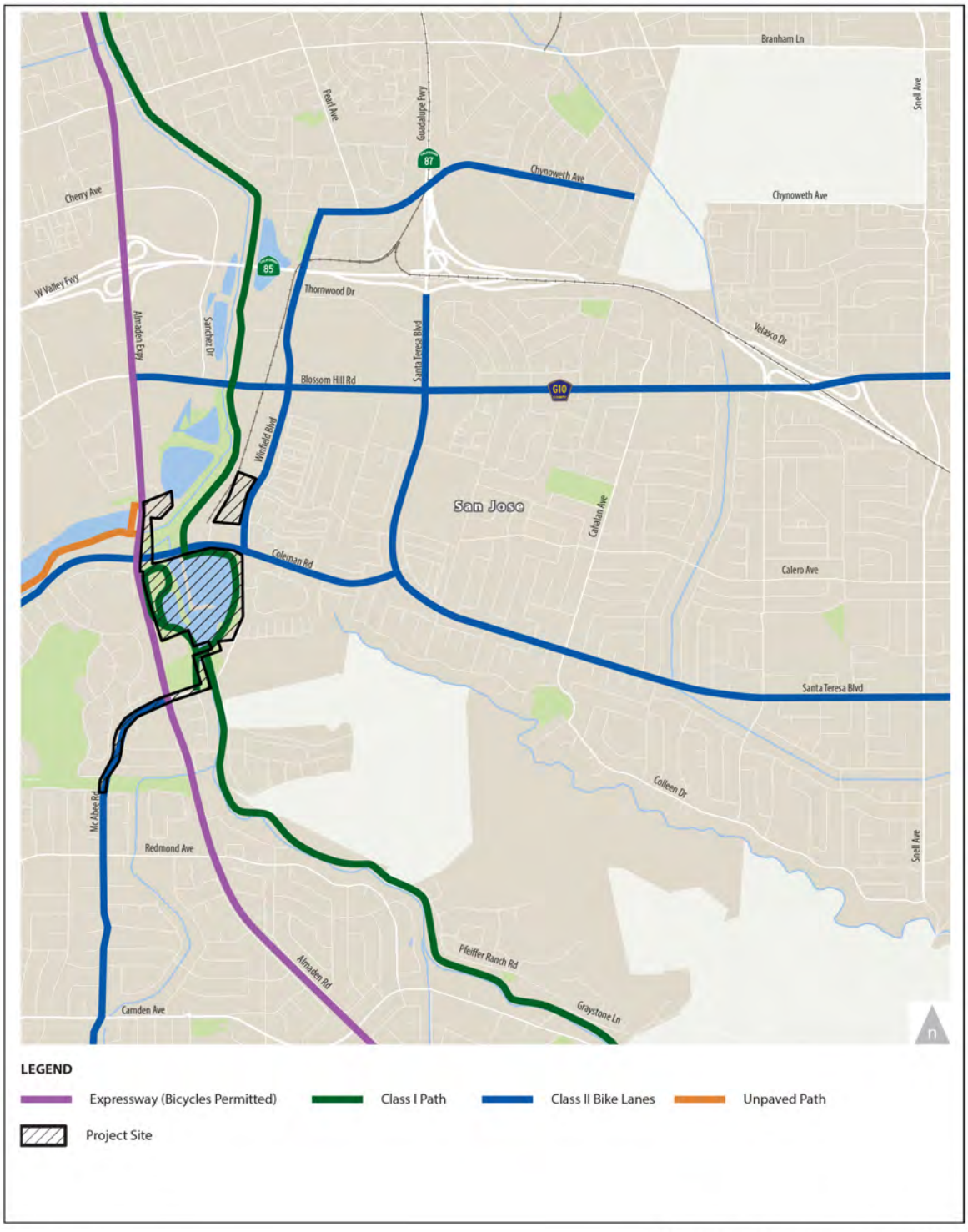
3.O.2 Regulatory Setting

Federal Regulations

There are no federal regulatory transportation plans or programs that are applicable to impacts of the Project's temporary construction-period activities. As described below, there would be no permanent (ongoing) transportation effects caused by the Project (i.e., after construction is complete).

State Regulations

The California Department of Transportation (Caltrans) has jurisdiction over state highway facilities including SR 85 and SR 87, which would be used for regional access to the Project site. Caltrans does not have any regulatory transportation plans or programs that are applicable to impacts of the Project's temporary construction-period activities. As described below, there would be no permanent (ongoing) transportation effects caused by the Project (i.e., after construction is complete).



SOURCE: Fehr and Peers

Almaden Lake Improvement Project . 130679

Figure 3.O-3 (Revised)
Existing Bicycle Facilities

Local Regulations

The following policy from Chapter 6, Land Use and Transportation, of *Envision San José 2040* (the City's General Plan), pertains to the goal of providing for the safe and efficient movement of goods to support commerce and industry.

> TR-6.1. Minimize potential conflicts between trucks and pedestrian, bicycle, transit, and vehicle access and circulation on streets with truck travel.

Apart from TR-6.1, there are no other local regulations that pertain to the assessment of Project construction effects on Transportation. The City of San José has guidance for recommended temporary traffic control measures, but they are not mandatory and only apply to construction activities on or adjacent to a roadway (City of San José, 2005).

3.O.3 Impacts and Mitigation Measures

Significance Criteria

Implementation of the Project would have a significant impact on transportation if it were to:

- Conflict with a project plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities;
- Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b);
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); or
- Result in inadequate emergency access.

Approach to Analysis

This analysis differs from typical transportation impact analysis performed for land development projects because the changes in the transportation conditions due to Project construction are temporary and construction activities would result in a relatively small increase in traffic volumes in the study area relative to existing traffic volumes. This study evaluates the traffic volumes during the peak sustained traffic conditions, during which construction of six elements of the Project could overlap, which would last approximately 18 business days.[1]

Santa Clara VTA and City of San José Analysis Type Determination

The Santa Clara County VTA requires all local jurisdictions to conform to the Congestion Management Program Transportation Impact Analysis guidelines (October 2014) to evaluate the transportation impacts of all land use decisions within the Member Agency's jurisdiction that are projected to generate 100 or more permanent AM or PM weekday peak-hour trips. The Project would not generate any new traffic after construction is completed, and although

[1] The 18-day duration of peak construction traffic was determined based on start/finish dates by construction phase from the CalEEMod inputs used for the Air Quality analysis (see Appendix B.2).

the construction of the Project is expected to generate more than 100 AM or PM weekday peak-hour trips (as documented herein), these trips would only be generated on a temporary basis and would not represent a permanent condition. Therefore, a detailed transportation impact analysis per VTA guidelines (such as intersection analysis) is not required.

The City of San José requires detailed transportation impact analysis for most development projects. The *City's Transportation Analysis Handboo*k (April 2018) provides guidelines and policies that guide transportation impact analysis. This latest update to the Handbook aligns with the City's new Transportation Analysis Policy (Council Policy 5-1), which replaces the level of service (LOS) threshold with a vehicle miles traveled (VMT) threshold. However, the Handbook also indicates that the transportation analysis conducted for a project must demonstrate compliance with the Congestion Management Program. Therefore, the trip generation guideline to evaluate the transportation impacts for land development that are projected to generate 100 or more AM or PM weekday peak-hour trips was considered as applicable for this study. As described above, since the Project is not expected to generate any new traffic after construction is complete, and the construction traffic is a temporary condition, a detailed transportation impact analysis per City guidelines (such as intersection analysis) is not required.

Roadway Segment Analysis Methodology

Daily roadway segment analysis is provided in this study to provide context and to demonstrate that construction of the Project would contribute a small amount of traffic to the surrounding roadway network. To determine the extent to which construction of the Project would add traffic to the surrounding roadway network, the percent of daily construction traffic added to study roadway segments is calculated (for the construction period with the highest traffic volumes). Because truck traffic takes up more physical room on roadways than a passenger car and has slower acceleration/deceleration, truck traffic was considered to have two-times the effect that a single passenger car has. Therefore, truck traffic generated by the Project was multiplied by a "passenger car equivalent" (PCE) factor of 2.

Avoidance and Minimization Measures Incorporated into the Project

Avoidance and minimization measures are those parameters that have been built into the design of the Project and are committed to as part of Project implementation. These measures are generally included in the Project Description (Section 2.E.1) of this report, but where appropriate, the specific measures related to the impact evaluations are also summarized below.

The following avoidance and minimization measure is contained in the District's Best Management Practices (BMP) Handbook (SCVWD, 2014), and has been incorporated into the Project. This measure would generally help to reduce the intensity of impacts associated with the Project, in accordance with District policy.

TR-1. Use Suitable Public Safety Measures.

Impact Summary

Table 3.O-2 provides a summary of transportation impacts by implementation phase (construction and operation).

TABLE 3.O-2
SUMMARY OF TRANSPORTATION IMPACTS

Impact Statement	Construction	Operation
Impact 3.O-1: The Project would increase traffic volumes on area roadways, but would not conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.	LS	NI
Impact 3.O-2: The Project would not conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)	LS	NI
Impact 3.O-3: The Project would not substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	LS	NI
Impact 3.O-4: The Project would not result in inadequate emergency access.	LS	NI

LS = Less than Significant
NI = No Impact

Impacts and Mitigation Measures

Impact 3.O-1: The Project would increase traffic volumes on area roadways, but would not conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. (Less than Significant)

Construction Impacts – Roadways

Project construction would require construction activities that would generate a temporary increase in traffic volumes on area roadways. The amount of that increased traffic on area roadways is determined by estimating project trip generation, and then assigning the project trips to specific road segments based on the anticipated direction of travel to and from the project site (north-south-east-west). This process is described in more detail in the following sections.

Trip Generation

Construction traffic would be generated by construction workers and construction activities over a two-and-a-half-year period. Based on the construction schedule, the busiest construction period would last 18 working days, during which construction of the following six elements of the Project would overlap and generate about 679 daily trips (see Table 3.O-3):

- Working surface/vegetation and debris removal
- Expanded and new islands
- Transfer pipeline from Almaden Valley Pipeline

- Lake area with clay cap
- Alamitos restored channel area with clay cap
- Transfer pipeline to ~~Los~~ Alamitos / Los Capitancillos percolation ponds

TABLE 3.O-3
WEEKDAY CONSTRUCTION CONDITIONS TRIP GENERATION SUMMARY
(DURING 18-DAY OVERLAP OF PROJECT ACTIVITIES)[3]

	Daily	AM Peak Hour[1]			PM Peak Hour[1]		
		Total	In	Out	Total	In	Out
Construction Workers	120	48	48	0	48	0	48
Truck Haul Trips	559	51	34	17	51	17	34
Truck Haul Trips *PCE*[2]	*1,118*	*102*	*68*	*34*	*102*	*34*	*68*
Total Without PCE	679	99	82	17	99	17	82
Total With PCE	*1,238*	*150*	*116*	*34*	*150*	*34*	*116*

1 "AM in" and "PM in" refers to vehicles entering the construction site during the AM/PM peak hour. "AM Out" and "PM Out" refers to vehicles exiting the construction site during the AM/PM peak hour.

2 PCE = Passenger Car Equivalent; a PCE rate of 2 vehicles per truck was used

3 The 18-day overlap presented in Table 3.O-3 represents the period of construction that will generate the greatest volume of traffic on area roadways. During other periods of construction, fewer trips would be generated.

SOURCES: Fehr & Peers, 2016; ESA (Appendix B.2 of this EIR), 2019.

As the table shows, the overlap would generate 150 PCE trips (99 vehicle trips excluding the PCE factor) for both weekday morning and evening peak hours, which is above the minimum 100 weekday peak hour trips required to perform a detailed transportation impact analysis per the VTA Congestion Management Program Transportation Impact Analysis guidelines.

As discussed in Section 2.E.3, Summary of Construction Equipment/Crews/Duration, construction activities would typically occur between the hours of 7 am and 7 pm, Monday through Friday. With written approval from the City of San José, construction activities could also occur on Saturdays from 8 am to 5 pm. However, for the purpose of considering transportation impacts associated conflicts with a program, plan, ordinance or policy addressing the circulation system, this analysis considers the potential for all PCE trips to occur during the weekday morning and evening peak hours.

For the morning peak hour, most truck haul trips would consist of inbound trucks, as it would presumably take some time to load/unload them for their outbound trips. For the evening peak hour, it is assumed most truck haul trips would consist of outbound trucks, as the final exiting loads for the day would occur during this time. Outside of the morning and evening peak hours, truck haul trips are assumed to be equally distributed between inbound and outbound trips.

Below are additional details for the 18-day overlap period, which were extracted from the Air Quality analysis assumptions provided in Appendix B.2 of this EIR:

- 8-person construction work crew for each of the six Project elements. Total of 120 daily vehicle trips (8 commute trips to the site during the morning peak hour, and 8 commute

trips away from the site during the afternoon peak hour, with 4 additional lunch or errand vehicle trips occurring during the day).

- 16-Cubic Yard (CY) capacity haul trucks, and the truck trips would be spread evenly throughout the phase duration.
- Working Surface/Vegetation and Debris Removal:
  - No truck trips of cut and fill material (2 vendor truck trips only).
- Construct Expanded and New Islands:
  - 85 daily haul truck trips of fill material (no cut).
- Transfer Pipeline from Almaden Valley Pipeline to ~~Los Alamitos Percolation Pond~~ Almaden Lake:
  - 2 daily haul truck trips of cut and fill material.
- Construct lake Area Clay Cap:
  - 228 daily haul truck trips of cut and fill material.
- Alamitos Restored Channel Area Clay Cap:
  - 219 daily haul truck trips of cut and fill material.
- Transfer Pipeline to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds:
  - 23 daily haul trips of cut and fill material.

Trip Distribution and Assignment

As indicated above, the majority of the Project construction trips would consist of haul truck trips that would transport cut and fill material to and from the Project site. The construction staging area would be the lakebed, the southwestern lawn area of Almaden Lake Park, and north of the Project site at the District's Winfield Warehouse yard, and would be accessed via Almaden Expressway, Coleman Road, and Winfield Boulevard. The haul trips would primarily use freeway facilities and, because SR 85 does not permit haul trucks, would mostly use SR 87. The other (smaller) portion of trips are associated with the construction workers who would gain access to parking spaces provided at the Project site via Winfield Boulevard.

The daily volumes generated by the Project plus the existing daily volumes are shown below in Table 3.O-4. Due to uncertainty as to how many trucks would access the Project site from each of the three access points (i.e., Almaden Expressway, Coleman Road, and Winfield Boulevard), and which roadways construction workers would use to access the parking area off of Winfield Boulevard, it was conservatively assumed that all trucks and construction worker trips generated by Project construction could travel on any of the six study roadway segments. Therefore, 679 daily Project trips (559 truck trips, 120 worker trips) were added to all study roadway segments. Taking into account the PCE factor for the truck trips, this would be the equivalent of approximately 1,238 daily Project trips.

TABLE 3.O-4
EXISTING AND EXISTING PLUS PROJECT DAILY ROADWAY SEGMENT VOLUMES
(DURING 18-DAY OVERLAP OF PROJECT ACTIVITIES)

Roadway Segment	Classification	Number of Travel Lanes	Existing	Existing plus Project	% increase
Almaden Expressway: SR 85 to Blossom Hill Road	Expressway	6	73,920	75,158	1.7%
Almaden Expressway: Redmond Avenue to Via Valiente	Expressway	4	34,840	36,078	3.6%
Coleman Road: Almaden Expressway to Winfield Boulevard	Minor Arterial	4	27,510	28,748	4.5%
Winfield Boulevard: South of Coleman Road	Minor Arterial	4	4,830	6,068	25.6%
Santa Teresa Boulevard: Blossom Hill Road to Coleman Road	Principal Arterial	6	20,340	21,578	6.1%
Blossom Hill Road: Almaden Expressway to Winfield Boulevard	Principal Arterial	6	32,310	33,548	3.8%

SOURCES: Santa Clara County Roads and Airports, 2016; ESA, 2019.

The estimates in Table 3.O-4 reflect the most conservative scenario of maximum traffic activity on all study roadways. In reality, the total number of construction vehicles on any one roadway would be less than that assumed, and construction-related traffic activity would generally be spread out using a number of possible travel paths to access the Project site. It also represents the busiest three-week period identified in the preliminary construction schedule. During other periods of construction, fewer trips would be generated.[2]

Based on these conservative assumptions, the Project would result in temporary maximum increases in traffic volumes on the study roadways that range from 1.7 percent (Almaden Expressway between SR 85 and Blossom Hill Road) to 25.6 percent (Winfield Boulevard south of Coleman Road). Almaden Expressway already operated at LOS F, but the maximum potential increased from construction activities is within the range of typical daily variation in traffic levels (usually on the order of ± 5 percent) that might be expected on the major roadways serving the Project site, and roadway operating conditions would remain substantially similar to current conditions. Increased traffic on other roadways would also fall within this typical daily variation. The traffic volume on Winfield Boulevard in the Project area is about 4,830 vehicles per day, and the addition of up 1,238 vehicle trips per day would represent an increase of up to about 26 percent. That percent increase in traffic volume

[2] The Draft EIR assumed a 24-month construction period which is now projected to extend over a longer period of at least 30 months. This will extend total construction related trips over a greater period, reducing the average daily amount. However, the evaluation of traffic impacts is based on the 18-day period of construction with the greatest activity, which would not change based on changes to the start date, construction period, or revisions to Table 2-3. For these reasons, the Draft EIR traffic estimates have not been revised, and they continue to represent a conservative estimate for the Project.

(greater than the above-cited ± 5 percent typical daily variation in traffic levels) would be noticeable to the average motorist. However, traffic operating conditions on Winfield Boulevard, a four-lane divided arterial, would not fall below LOS C conditions (existing conditions) until a volume of about 32,400 daily vehicles is reached (FDOT, 2012). Therefore, the available capacity on Winfield Boulevard is adequate to accommodate the increase in traffic, which would mostly occur during non-peak traffic hours. Based on these factors, impacts to the performance of the traffic circulation conditions would be less than significant during Project construction.

Operations Impacts – Roadways

The City of San José would be responsible for maintenance of the new open park area, while anticipated maintenance activities for the District would include embankment and levee inspection and repair, sediment removal from the restored creek, levee settlement adjustment, restored vegetation maintenance and management along the restored creek and islands, lake water quality monitoring, and maintenance road grading and upkeep.

Vehicle trips generated by Project operations would be similar in number to those generated by existing and ongoing maintenance activities at Almaden Lake. New regular vehicle trips associated with Project operations would be limited to one truck trip every two weeks to maintain the new landscaping for the first three years after the Project is constructed. Other maintenance activities such as levee maintenance and inspection, bank repair, levee settlement adjustment, and sediment removal are irregular and rare, in relation to existing traffic volumes on study area roadways (see Table 3.O-4), this increase of one truck trip every two weeks would not affect roadway operations. There would be no impact related to Project operations.

Construction Impacts – Transit, Bicycle, and Pedestrian Facilities

Construction of the Project would neither directly nor indirectly eliminate existing or planned alternative transportation corridors or facilities (e.g., bike paths, lanes, etc.), including changes in policies or programs that support alternative transportation, nor construct facilities in locations which future alternative transportation facilities may be planned. The Project would not conflict with adopted policies, plans and programs supporting alternative transportation.

As described in Impact 3.O-1, construction activities associated with the Project would not generate traffic volume increases that would significantly affect traffic flow on area roadways. Pipeline construction within McAbee Road would require closure of a lane of traffic and potentially the bicycle lane in the immediate stretch of pipeline that is under construction over an eighty day period. Construction is expected to proceed at a rate of approximately 100 linear feet per day. Use of the lane and bicycle lane would be restored after each pipeline segment is complete. Impacts to bikes lanes and pedestrian access would be limited in area, with available detours posted, and temporary with any given area only impacted a few days. The performance of public transit, in street bicycle, and pedestrian facilities in the area likewise would not be adversely affected (see Section 3.N, Recreation, related to Project

effects on Almaden Lake Trail, Alamitos Creek Trail, and Guadalupe River Trail), and the Project impact would be less than significant.

Operations Impacts – Transit, Bicycle, and Pedestrian Facilities

Similar to Project construction, operation of the Project would neither directly nor indirectly eliminate existing or planned alternative transportation corridors or facilities, including changes in policies or programs that support alternative transportation. The Project would not conflict with adopted policies, plans and programs supporting alternative transportation.

As described in Impact 3.O-1, operation of the Project would not generate more vehicle trips than are generated by current operation and maintenance activities. The performance of public transit, bicycle and pedestrian facilities in the area would be unaffected, and there would be no impact related to Project operations.

Impact 3.O-2: The Project would not conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b). (Less than Significant)

Section 15064.3 of the CEQA Guidelines applies mainly to analysis of VMT impacts associated with land use and transportation projects. Furthermore, projects that generate or attract fewer than 110 operational trips per day are generally exempt from further consideration with respect to VMT and impacts are assumed to be less than significant. (State of California Office of Planning and Research, 2018). Additionally, the City's VMT analysis guidance indicates that local-serving public facilities meet the City's screening criteria, meaning they are not subject to analysis, because they produce very low VMT (City of San José, 2018).

Per this statewide and local guidance, since the Project ~~is neither a land use nor a transportation project,~~ is a local-serving public facility, and would not generate many more vehicle trips than are generated by current operation and maintenance activities for Almaden Lake, it can be assumed to have a less than significant impact with respect to VMT.

Mitigation Measures

None required.

Impact 3.O-3: The Project would not substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). (Less than Significant)

Construction Impacts

Project construction would not alter the physical configuration of the existing roadway network serving the area, and would not introduce unsafe design features. The Project also would not introduce uses (types of vehicles) that are incompatible with existing uses already served by the road system that serves the Project site. Although higher traffic volumes could increase the potential for added vehicle collisions, Project-generated increases in traffic would be temporary and intermittent during Project construction (see Impact 3.O-1). Therefore, the Project impact to traffic safety hazards would be less than significant.

These impacts would be further reduced through adherence to the following avoidance and minimization measure, described previously: TR-1: Use Suitable Public Safety Measures.

Operations Impacts

Project operation would not alter the physical configuration of the existing roadway network serving the area, and would not introduce unsafe design features. The Project also would not introduce uses (types of vehicles) that are incompatible with existing uses already served by the road system that serves the Project site. Operation of the Project would not generate more vehicle trips than are generated by current operation and maintenance activities for Almaden Lake (see Impact 3.O-1). There would be no impact related to Project operations.

Mitigation Measures

None required.

Impact 3.O-4: The Project would not result in inadequate emergency access. (Less than Significant)

Construction Impacts

The Project would not change the configuration of the Project area's road network, and would not require the temporary closure of public roads during construction. As described in Impact 3.O-1, Project construction would not cause a significant increase in congestion on area roadways, though heavy construction-related vehicles could interfere with emergency response to the site or emergency evacuation procedures in the event of an emergency (e.g., vehicles traveling behind a slow-moving truck). The ~~three~~ four adjacent roads that would experience use by construction vehicles: Winfield Boulevard, Almaden Expressway, ~~and~~ Coleman Road, and McAbee Road, all have at least two lanes in each direction. Pipeline construction along McAbee Road would require use of one travel lane in the pipeline segment under construction over a period of eighty days, with construction proceeding at approximately 100 linear feet per day. Construction vehicles traveling to and from the site would have room to pull over and let emergency vehicles pass, and emergency vehicles would have room to go around construction vehicles and the work zone on McAbee Road. ~~and v~~ Vehicles are required by law to yield to emergency vehicles that have siren and lights on. It is not considered likely that heavy construction-related traffic would result in inadequate

emergency access. The Project would have a less than significant impact on emergency access.

Operations Impacts

Project operation would not alter the physical configuration of the existing roadway network serving the area, and would not introduce unsafe design features. The Project also would not introduce uses (types of vehicles) that are incompatible with existing uses already served by the road system that serves the Project site. Operation of the Project would not generate significantly more vehicle trips than are generated by current operation and maintenance activities for Almaden Lake (see Impact 3.O-1). There would be no impact related to Project operations.

Mitigation Measures

None required.

3.O.4 References

City of San José, *Transportation Analysis Policy (Council Policy 5-1)*, effective March 29, 2018.

City of San José, *Envision San José 2040 General Plan,* adopted October 2011 and amended in February 2018.

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Santa Clara County, Department of Roads and Airports, *Official County Road Book 2018*, July 2018.

Santa Clara Valley Water District, 2014; District's Best Management Practices (BMP) Handbook

State of California Office of Planning and Research, *Technical Advisory on Evaluating Transportation Impacts in CEQA*, December 2018.

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3.P Utilities and Service Systems

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to utilities and service systems, and includes an analysis of impacts to those resources from the Project. For the purpose of this assessment, utilities and service systems include water supply, wastewater collection, stormwater drainage, natural gas, petroleum, electricity, telecommunications, and solid waste disposal. Santa Clara Valley Water District (District) best management practices (BMPs) and mitigation measures to avoid or reduce significant impacts are also identified, as applicable.

3.P.1 Environmental Setting

Water, Wastewater, and Stormwater Drainage

The Project is located in Santa Clara County within the southern portion of the City of San José (Figure 2-1, in Chapter 2, Project Description), in the Guadalupe River Watershed. The Project is within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (RWQCB), as well as the jurisdiction of the District.

The District water supply system consists of a network of water management facilities, which include ten reservoirs and dams, nearly 400 acres of groundwater recharge ponds, 143 miles of pipeline, three water treatment plants, an advanced recycled water treatment plant, three pumping plants, and a treated water reservoir. The District covers 16 jurisdictions (15 cities and Santa Clara County), serves 12 water retailers, and supplies 2 million residents and commuters (SCVWD, 2013). The District also maintains 275 miles of creeks. The headwaters of all covered creeks and rivers originate in unincorporated Santa Clara County. Several of the creeks travel through multiple local jurisdictions before flowing to the San Francisco Bay.

The District receives water from federal, state, and local sources for treatment and delivery to water retailers or for groundwater recharge. The District imports water from the San Felipe Project via the San Luis Reservoir from the south, and from the State Water Project via the South Bay Aqueduct from the north (SCVWD, 2015a). The District maintains the groundwater basins and sells water to local municipalities and private retailers which in turn deliver drinking water directly to end users. For water supply, the area around Almaden Lake is served by the San José Water Company.

The City of San José is responsible for stormwater drainage throughout the city. Stormwater from urban infrastructure accumulates in the storm drain system and flows to local creeks.

The San José/Santa Clara Regional Wastewater Facility, located near Alviso, is currently undergoing an upgrade, and is presently the largest tertiary level treatment facility in the western United States, serving 1.4 million residents.

Municipal water needs for the Project area include irrigation, restrooms, concession stand, drinking fountains, and water play features located in the Park supplied by the San José Water Company. The City provides conveyance facilities to transport wastewater produced

at the Park's restrooms to the San José/Santa Clara Regional Wastewater Facility. Pipes are along thoroughfares surrounding the Project site. Four storm drains convey stormwater from the surrounding neighborhoods to Almaden Lake.

Natural Gas and Electricity Conveyance

Pacific Gas and Electric Company (PG&E) is the principal electricity and natural gas provider in the vicinity of the Project area. Under deregulation, other companies may also provide electricity, although PG&E still delivers the service. PG&E owns the regional natural gas pipelines in the region. No major pipelines were identified within the footprint of the lake construction/upgrade area. Underground PG&E electric and gas conduits run parallel to or cross perpendicular to portions of the pipeline alignment corridors that would connect Almaden Lake to Almaden Valley Pipeline and ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds.

Telecommunications

The Project region is served by multiple telecommunications companies, including AT&T, Xfinity/Comcast, and Verizon/MCI. Telecommunications infrastructure includes telecommunication lines (including aboveground telephone lines and belowground cable lines) and service centers.

Solid Waste

There are five operating landfills in the Project vicinity that could accept Project-related construction and demolition waste. These include Guadalupe Sanitary Landfill in San José; Kirby Canyon Recycling and Disposal Facility in San José; Newby Island Sanitary Landfill in San José; Zanker Material Processing Facility in San José; and Zanker Road Resource Recovery Operations Landfill in San José. The California Integrated Waste Management Board (CIWMB) maintains facility information and waste stream profiles for all counties and jurisdictions in the state.

Hazardous waste associated with lake bottom mercury sediment would be disposed of at either the Kettleman Hills Facility in Kettleman, California or at an approved facility in Utah. The Kettleman Hills Facility provides waste treatment, storage, and disposal operations for hazardous wastes and for municipal solid waste. The facility is located on 1,600 acres, with 499 acres currently available and permitted for waste disposal activities. Waste treatment, storage, and disposal units include a hazardous waste landfill, two municipal solid waste landfills, a drum storage unit, two bulk storage units, and other hazardous waste management facilities. The facility is currently undergoing expansion to ultimately reach 695.5 acres of operational areas, providing 5 million cubic yards of additional disposal volume, that will be used for waste disposal, including hazardous wastes. Expansion of the facility was approved in May 2014.

3.P.2 Regulatory Setting

Federal Regulations

No federal regulations related to utilities and service systems apply to the Project.

State Regulations

California Public Utilities Commission

The California Constitution vests the California Public Utilities Commission (CPUC) with the sole authority to regulate privately owned and investor-owned public utilities, such as PG&E and the San José Water Company. This exclusive power extends to all aspects of utility regulation, including facility location, design, construction, maintenance, and operation. CPUC requires regulated utilities to work closely with local governments and give due consideration to local government concerns. The CPUC does not regulate publicly owned utilities such as the District.

California Integrated Waste Management Act of 1989

The California Integrated Waste Management Act (CIWMA) of 1989 (Public Resources Code [PRC], Division 30), enacted through Assembly Bill (AB) 939 and modified by subsequent legislation, required all California cities and counties to implement programs to reduce, recycle, and compost at least 50 percent of wastes by the year 2000 (PRC Section 41780). A jurisdiction's diversion rate is the percentage of its total waste that it diverts from disposal through reduction, reuse, and recycling programs. The State determines compliance with the mandate to divert 50 percent of generated waste through a complex formula. This formula requires cities and counties to conduct empirical studies to establish a "base year" waste generation rate against which future diversion is measured. The diversion rates in subsequent years are then determined by deduction rather than by direct measurement of material recycled and composted; i.e., cities and counties track the amount of material disposed of at landfills, then subtract that amount from the base-year amount, and the difference is assumed to be diverted (PRC Section 41780.2).

Utility Notification Requirements

Title 8, Section 1541 of the California Code of Regulations requires excavators to determine the approximate locations of subsurface installations such as sewer, telephone, fuel, electricity, and water lines (or any other subsurface installations that may reasonably be encountered during excavation work) prior to opening an excavation.

California law (Government Code Section 4216 et seq.) requires owners and operators of underground utilities to become members of and participate in a regional notification center, such as USA North. USA North receives reports of planned excavations from public and private excavators and transmits the information to all participating members that may have underground facilities at the location of an excavation. USA North members mark or stake their facilities, provide information, or give clearance to dig (USA North, 2016).

Local Regulations

Envision San José 2040 General Plan

The *Envision San José 2040 General Plan* (General Plan) provides planning guidance for projects within the City of San José. Specific to utilities, the General Plan contains policies that pertain to the Project, including solid waste goals.

> LOS-20: For solid waste management, the City should seek to exceed 50% diversion of waste from disposal, maintain 20 years of landfill capacity, and provide for storage and collection of recyclables from every location where solid waste is generated.

City of San José Zero Waste Resolution (No. 74077)

In 2007, the City of San José adopted a Zero Waste Resolution (No. 74077), which set a goal of 75 percent waste diversion by 2013 and a goal of zero waste by 2022 for the City.

Construction and Demolition Ordinances

City of San José

The City of San José's Construction and Demolition ordinance applies to all new residential construction of $115,000 or more, new non-residential construction of $135,000 or more, residential alterations of $2,000 or more, non-residential alterations of $5,000 or more, and all roofing projects that involve the removal of the existing roof. Applicants for covered projects must submit a security deposit based on project size and established by city council resolution. Material from projects can be taken to a certified construction and demolition (C&D) recycling facility or contractors and residents can document how the material was otherwise diverted. Within 180 days of project completion, the applicant must submit documentation showing the material was taken to a certified C&D recycling facility or diverted some other way. The documentation must be submitted with a request for reimbursement in order to get the security deposit returned. The Construction and Demolition Diversion Program ensures that at least 75 percent of construction and demolition waste is recovered and diverted from landfills (City of San José, 2019).

3.P.3 Impacts and Mitigation Measures

Significance Criteria

Implementation of the Project would have a significant impact on public utilities if it were to:

- Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electrical power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects;
- Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years;

- Result in a determination by the wastewater treatment provider that would serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals;
- Be out of compliance with federal, state, and local management and reduction statutes and regulations related to solid waste.

Approach to Analysis

The analysis of Project effects related to public utilities addresses temporary construction-related impacts as well as impacts during Project operation and maintenance. This analysis assumes that the District would comply with all applicable laws and regulations throughout construction, operation, and maintenance.

This analysis evaluates the effects of the landfill disposal requirements of the Project with respect to the available capacity of local landfills and the District's ability to comply with solid waste diversion rates.

No Impact Significance Determinations

Based on the nature of the Project, there would be no impact related to the following criterion:

Wastewater Treatment Requirements. No wastewater would be generated during construction or operations of the Project beyond existing uses, nor would the Project result in a decrease in quality of flows into the San José / Santa Clara Water Pollution Control Plant (WPCP) such that the Project would affect compliance with wastewater treatment requirements issued by the San Francisco Bay RWQCB, the agency that issues permits for discharge from the plant. The Project would not install new restrooms or other wastewater generating facilities or equipment.

Wastewater Facilities / Wastewater Treatment Capacity. The Project would not increase wastewater generation; therefore, no new wastewater treatment facilities would be required for the Project. The Project would not produce wastewater during construction or operations and would not affect the capacity of the San José / Santa Clara WPCP. Therefore, the Project would not require construction or expansion of wastewater facilities or affect the existing wastewater treatment capacity.

Impact Summary

Table 3.P-1 provides a summary of public utilities and service systems impacts by implementation phase (construction and operations).

TABLE 3.P-1
SUMMARY OF UTILITIES AND SERVICE SYSTEMS IMPACTS

Impact Statement	Construction	Operation
Impact 3.P-1: The Project would not require or result in the relocation or construction of new or expanded water treatment or storm water drainage, electrical power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects; the Project would not have insufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years.	LS	LS
Impact 3.P-2: The Project would not generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.	LS	LS
Impact 3.P-3: The Project would not be out of compliance with federal, state, and local management and reduction statutes and regulations related to solid waste.	LS	LS

LS = Less than significant

Impacts and Mitigation Measures

Impact 3.P-1: The Project would not require or result in the relocation or construction of new or expanded water treatment or storm water drainage, electrical power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects; the Project would not have insufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years. (Less than Significant)

Construction Impacts

Project construction would rely on existing on-site surface water for construction water needs, such as on-site dust control, and would not require the relocation or construction of new or expanded water treatment facilities, therefore the impact would be less than significant.

With respect to stormwater drainage, insomuch as Alamitos Creek can be considered a stormwater facility, the channel would be restored in the footprint of the lake and the impacts associated with this work are analyzed throughout the EIR. This section focuses on stormwater infrastructure installed by San José to convey stormwater from developed areas. Project construction would be managed so as to maintain capacity to manage storm flows in the event that a major storm event were to occur during the construction period, as discussed in Chapter 2, Project Description. Much of the construction work would be completed within the basin of Almaden Lake. Any stormwater occurring in these areas would drain into the lake bottom, where it would remain, temporarily, until being pumped out by the temporary construction pumping and dewatering system. Once sheet pile installation is complete, and creek, west bank, and new park area construction is complete, flows would be routed back to the creek, including during the rainy season. This would allow winter storm flows to pass through the construction area without damaging or substantially interfering with other construction activities. Storm drains that empty into the lake would be rerouted during

construction for discharge into the creek. After the installation of in-situ columns and construction of the levee, the sheet piles would be removed.

With respect to stormwater flows originating from the Project site during construction, the contractor would be responsible for implementing all BMPs for stormwater pollution prevention and control applicable to Project construction in compliance with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit. The stormwater BMPs would be applied in accordance with the California Stormwater Quality Association "Stormwater Best Management Practice Handbook."[1] With the implementation of stormwater BMPs during construction, the Project would not overburden existing stormwater drainage facilities such that they would require or result in the relocation or construction of new or expanded stormwater drainage facilities, therefore the impact would be less than significant.

Project construction would rely upon electricity provided by PG&E. Construction of the Project would not require natural gas. The telecommunications needs of the Project (construction-coordination cellular phone calls and GPS data) would be adequately served by the multiple telecommunications companies providing service in the Project area. Project construction would not require or result in the relocation or construction of new or expanded electrical power, natural gas, or telecommunications facilities, therefore the impact would be less than significant.

With regard to sufficiency of water supplies, once most of the lake water is drained during the initial part of construction, it is anticipated that dewatering of shallow lake sediments may be required prior to construction of the levee foundation and grading of the lake bed. The Project area would be dewatered using sump pumps, well points, removal of wet and soft material, and/or installation of temporary drainage management facilities around excavations. Once captured, dewatered water would be pumped into baker tanks to allow sediments to settle. Following settlement, captured water would be used for on-site dust control and/or be released into the creek in accordance with regulatory requirements. Because this shallow groundwater is available for on-site dust control, no other water supplies would be required during Project construction, therefore the impact related to insufficient water supply would be less than significant.

Operations Impacts

As described in Chapter 2, Project Description, a lake water level ranging from 188 feet to190 feet above msl (consistent with existing conditions) would be maintained with imported water from the Almaden Valley Pipeline. The Almaden Valley Pipeline is located approximately 0.5 miles upstream from Almaden Lake Park on Alamitos Creek. Imported water would be conveyed in an approximately 3,600 ~~2,900~~-foot underground pipe along McAbee Road ~~aligned between the east side of the Los Alamitos Creek Trail and the west side of Crossview Circle/ Court~~ (see Figure 2-4). It is estimated that the Project would require approximately 300 ~~600~~ acre-feet of water to fill the re-contoured and capped lake following construction. A water

[1] California Stormwater Quality Association (CASQA) best management practices handbooks are available to CASQA members online at: https://www.casqa.org/resources/bmp-handbooks/.

budget prepared for maintaining the lake determined that approximately 7.5 cubic feet per second (cfs) of water would be needed in the summer months to circulate through the lake to maintain water quality to support recreational uses (equivalent to 15 acre-feet a month). The remainder of the year would be slightly less (approximately 5 cfs) for a total of approximately 4,350 acre feet a year (AFY). To circulate the water, an equal amount of water would be pumped from the lake via an outlet structure into a new pipeline connecting to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds.

Under existing operations, the ~~Los~~ Alamitos Percolation Pond can be filled when the Alamitos Flashboard Dam is installed at the Alamitos Drop Structure. The ~~Los~~ Alamitos Percolation Pond and Guadalupe Percolation Ponds (which are fed by the ~~Los~~ Alamitos Percolation Pond) have a model recharge capacity of 22 acre-feet per day, or about 8,000 AFY. The water diverted to the percolation ponds can come from various water rights owned by the District (3,302 AFY from Guadalupe River; 2,500 AFY from Almaden Reservoir; 6,000 AFY from the Almaden-Calero Canal; 3,500 AFY from Calero Reservoir; and 3,500 AFY from Guadalupe Reservoir), or from imported water that can be released at Calero Reservoir, Alamitos Creek, or Guadalupe Creek to flow downstream to the Alamitos diversion. Almaden Valley Pipeline water is typically imported water under the District's Central Valley Project (CVP) contract, and comes from the delta via San Luis Reservoir through a series of pipes that brings water into Santa Clara County for distribution to water treatment plants, percolation facilities, Anderson Reservoir, Calero Reservoir, and/or local creeks for in-stream recharge. In addition to imported water, the Almaden Valley Pipeline can convey water captured at Anderson Reservoir and Calero Reservoir for water supply uses.

Since imported water sent to Almaden Lake from Almaden Valley Pipeline would ultimately be used for groundwater recharge in the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds, there would be no need to make legal changes to the use of the water. The ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds would need to be operated to account for inputs from both Almaden Lake and the Alamitos diversion, but the overall change would not substantially alter the amount of water available for groundwater recharge.

As described in Chapter 2, Project Description, there could be times when the District would not be able to provide Almaden Valley Pipeline water to Almaden Lake, including due to drought conditions, insufficient imported water supply, periodic system maintenance, or higher pressing water supply needs elsewhere in Santa Clara County. In these circumstances water would not be provided to Almaden Lake, and the District could also temporarily suspend pumping lake water to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds. Should availability of Almaden Valley Pipeline water be temporarily suspended, the District would expect Almaden Lake water levels to remain relatively stable due to the underlying soil properties of the lake bed. The existing soils remaining in the lake bed after quarry operations ceased have low permeability properties, and would not be conducive to lake water percolation into groundwater. In addition, the Project would cap the lake bed with an impermeable clay layer about 2.5 feet thick, further reducing the ability of lake water to percolate into groundwater. As a result, lake water levels would remain

generally stable during periods when Almaden Valley Pipeline water would not be supplied (and outlet pumping from the lake to the percolation Ponds would be similarly suspended), with lake water losses generally being limited to evaporation.

The use of imported Almaden Valley Pipeline water for Project operations would not require or result in the relocation or construction of new or expanded water facilities. During temporary periods when Almaden Valley Pipeline water would not be available for the lake flow-through water system, lake water levels would remain generally stable due to underlying lake bed soil impermeability. As a result, should insufficient water supplies be available to serve the Project under reasonably foreseeable future development during normal, dry and multiple dry years, the District would temporarily suspend pumping lake water to the percolation Ponds. Under these circumstances, the District would expect lake water levels to remain generally stable due to underlying lake bed soil impermeability until inflows of Almaden Valley Pipeline water could resume; therefore, this impact would be less than significant.

With respect to stormwater drainage, stormwater within the Project footprint is currently managed on site, and would continue to be managed on site under the Project. Herein, stormwater collected on site would be discharged into the upgraded stream on site (western portions of the Project site) or into Almaden Lake. The Project would result in an increase in park land area in comparison to existing conditions, but would not substantially increase impervious surface area, and therefore would not result in a substantial net increase in stormwater on site. During storms, water would be collected in swales or catchments, including applicable stormwater BMPs, before being released into adjacent waterways on site. For a discussion of BMPs and other stormwater management facilities that would be deployed in support of the Project, please refer to the stormwater impact analysis contained in Section 3.K, Hydrology and Water Quality. The Project would not increase stormwater discharges to offsite, and therefore would not require or result in the relocation or construction of new or expanded offsite stormwater management facilities, and this impact would be considered less than significant.

Operations and maintenance of the Project would be similar to existing Project operations with respect to electricity, natural gas, and telecommunications supply. Project operations would rely upon electricity and natural gas provided by PG&E and would require provision of the electrical requirements of the pump station ~~with a pumping capacity of up to 20 cfs~~. The telecommunications needs of the Project would be adequately served by the multiple telecommunications companies providing service in the Project area. Project operations would not require or result in the relocation or construction of new or expanded electrical power, natural gas, or telecommunications facilities, therefore the impact would be less than significant.

Mitigation Measures

None required.

Impact 3.P-2: The Project would not generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals. (Less than Significant)

Construction Impacts

As described in Section 2.E.2, Construction Phases, Excavation and Fill, the bottom lake and shoreline soil would be suitable for on-site reuse for re-contouring Almaden Lake or reconfiguring the channel of Alamitos Creek, or may require disposal offsite at a non-hazardous Class III landfill consistent with California thresholds for hazardous waste classification. As shown in Table 2-2, the Project is estimated to generate approximately ~~194,000~~ 207,054 cubic yards of cut volume, and is estimated to require approximately ~~897,690~~ 814,864 cubic yards of fill volume. To the extent feasible, the Project would utilize the cut volume generated on-site.

However, some lake bottom soil samples exceeded environmental screening levels (ESLs) established by the San Francisco Bay RWQCB (December 2013), and non-landfill re-use options may be limited (LA&S, 2014; LA&S, 2015). ~~Therefore, all cut material would be stockpiled in the lake body for reuse as fill material in the lake and creek bed.~~ All fill at the lake bottom would be capped by a imported clay layer about 2.5 feet thick, sealing sediments contaminated with mercury at the bottom of the lake and preventing its entry into the food chain. Up to 25,000 cubic yards of soils that exceed California thresholds for hazardous waste may be transported to an approved disposal site in Kettleman, California or Utah (SCVWD, 2015b). If any soil is found to contain hazardous materials, excess spoils would be characterized, transported from the Project site in lined container trucks, and disposed of at an appropriate landfill in compliance with federal, State, and local regulations. Refer to Section 3.J, Hazards and Hazardous Materials, for information regarding disposal of hazardous materials. Based on existing available capacity and operations, as well as anticipated near term expansion, it is anticipated that the Kettleman, California site would have sufficient capacity to accept this volume of waste;[2] however, conservatively, even in the event that disposal capacity is not available, hazardous sediments would be shipped to Utah for disposal.

The Project would also generate other construction and demolition waste. As described in Section 3.P.2, Regulatory Setting, the City of San José's Construction and Demolition Debris Ordinance and Zero Waste Resolution (No. 74077) require that at least 75 percent of waste tonnage is diverted. Approved facilities that accept mixed C&D debris for sorting and recycling include the following: Guadalupe Sanitary Landfill in San José; Kirby Canyon Recycling and Disposal Facility in San José; Newby Island Sanitary Landfill in San José; Zanker Material Processing Facility in San José; and Zanker Road Resource Recovery Operations Landfill in San José (CalRecycle, 2016). It is anticipated that the receiving landfill(s) would receive up to 500 cubic yards of C&D materials, which would include primarily concrete, over the construction period. Because cut volumes would be reused on site to the extent feasible, hazardous soils would be taken to an appropriate disposal facility,

[2] The facility is located on 1,600-acre property with 499 acres currently available and permitted for waste management activities http://kettlemanhillslandfill.wm.com/fact-sheets/2011/facility-overview.jsp.

and adequate capacity exists at the local receiving landfills for construction and demolition waste materials described above, impacts related to generating solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impairing the attainment of solid waste reduction goals during construction would be less than significant.

Operations Impacts

The City of San José would continue to be responsible for collecting litter around the perimeter of the lake and for trash and debris removal from within the Park. City removal of solid waste generated during Park operations would be similar to existing conditions, and would not be part of the Project. Landfills serving the City include Guadalupe, Kirby Canyon, Newby Island, Zanker Material Processing Facility, and Zanker Road. Closure dates for three of the landfills range from 2021 to 2025 with Newby Island Landfill having a permit to continue operating through 2041 (CalRecycle, 2019), and the Zanker landfills having no closure date due to the minimal amount of materials being landfilled each year at both these facilities. The total permitted landfilling capacity of the five operating landfills in the City is approximately 5.3 million tons per year (San José, 2011). Available landfills would easily maintain sufficient capacity to accept the volumes of operation period solid waste.

As described in Section 2.F.1, Long-Term Monitoring and Maintenance Activities, disposal of debris from routine creek channel maintenance, such as sediment removal or erosion repair could be required, and would be conducted as currently occurs under the Stream Maintenance Program ~~require the removal of up to 5,000 cubic yards of material from the Alamitos Creek section every 10 years~~. Excavated sediment would continue to be reused on site where feasible, or would be disposed of at a landfill or other suitable site, and would comply with all applicable regulations for disposal of solid waste.

For the reasons described above, it is expected that the landfills in the vicinity of the Project site would have adequate capacity to accommodate this infrequent disposal, and impacts related to generating solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impairing the attainment of solid waste reduction goals during operation and maintenance would be less than significant.

Mitigation Measures

None required.

Impact 3.P-3: The Project would not be out of compliance with federal, state, and local management and reduction statutes and regulations related to solid waste. (Less than Significant)

Construction Impacts

Project construction would generate waste materials, including construction debris and excavated spoils that could exceed the local waste diversion goals or daily tonnage limit of local landfills, which would be a significant impact. However, the City of San José's Construction and Demolition Ordinance prohibits C&D materials from being placed into the trash or sent directly to a landfill. Compliance with this ordinance would ensure that all Project-related waste would be taken to a registered facility, which would arrange for the proper recycling, reuse, and disposal of the C&D materials that the Project produces. The C&D program requires that at least 75 percent of C&D debris is recovered and diverted from landfills. Therefore, construction impacts related to compliance with federal, State, and local solid waste management and reduction statutes and regulations would be less than significant. If any soil is found to contain hazardous materials, excess spoils would be characterized, transported from the Project site in lined container trucks, and disposed of at an appropriate landfill in compliance with federal, State, and local regulations. Refer to Section 3.J, Hazards and Hazardous Materials, for information regarding disposal of hazardous materials.

Operations Impacts

As noted above, disposal of debris from routine creek channel maintenance, such as sediment removal or erosion repair could be required. ~~require the removal of up to 5,000 cubic yards of material from the Alamitos Creek section every 10 years.~~ Excavated sediment would continue to be reused on site where feasible, or would be disposed of at a landfill or other suitable site, and would comply with all applicable regulations for disposal of solid waste.

Vegetation management, trash and debris removal within the Park, including the new Park elements, would continue to be the responsibility of the City of San José. Therefore, operations impacts related to compliance with federal, State, and local solid waste statutes and regulations would be less than significant.

Mitigation Measures

None required.

3.P.4 References

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CHAPTER 4
Alternatives

4.A Introduction

This chapter presents the California Environmental Quality Act (CEQA) alternatives analysis for the Almaden Lake Improvement Project (Project). The CEQA Guidelines, Section 15126.6(a), state that an Environmental Impact Report (EIR) must describe and evaluate a reasonable range of alternatives to the Project that would feasibly attain most of the Project's basic objectives and would avoid or substantially lessen any identified significant adverse environmental effects of the Project. Specifically, the CEQA Guidelines (Section 15126.6) set forth the following criteria for selecting and evaluating alternatives:

- *Identifying Alternatives*. The selection of alternatives is limited to those that would avoid or substantially lessen any of the significant effects of the project, are feasible, and would attain most of the basic objectives of the project. Factors that may be considered when addressing the feasibility of an alternative include site suitability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, economic viability, and whether the proponent can reasonably acquire, control, or otherwise have access to an alternative site. An EIR need not consider an alternative whose impacts cannot be reasonably ascertained and whose implementation is remote and speculative. The specific alternative of "no project" must also be evaluated.
- *Range of Alternatives.* An EIR need not consider every conceivable alternative, but must consider and discuss a reasonable range of feasible alternatives in a manner that will foster informed decision-making and public participation. The "rule of reason" governs the selection and consideration of EIR alternatives, requiring that an EIR set forth only those alternatives necessary to permit a reasoned choice. The lead agency (the Santa Clara Valley Water District [District]) is responsible for selecting a range of project alternatives to be examined and for disclosing its rationale for choosing the alternatives.
- *Evaluation of Alternatives.* EIRs are required to include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. Matrices may be used to display the major characteristics and the environmental effects of each alternative. If an alternative would cause one or more significant effects that would not result from the project as proposed, the significant effects of the alternative must be discussed, but in less detail than the significant effects of the project.

Section 4.B describes the alternatives selection process and the objectives of the Project; summarizes the significant impacts of the Project; describes the alternatives selected for detailed analysis; and compares the environmental impacts of each alternative to those of the Project. Section 4.C provides a comparison of the alternatives, and identifies the environmentally superior alternative. Section 4.D discusses the preliminary alternatives that were considered, but rejected from further consideration.

4.B Almaden Lake Improvement Project Alternatives Analysis

This section describes the process of developing a reasonable range of Almaden Lake Improvement Project alternatives for analysis in this EIR. Consistent with CEQA, the approach to alternatives selection for this EIR focused on identifying alternatives that: (1) could meet most of the basic objectives of the Project while reducing one or more of its significant impacts, (2) could foster informed decision-making and public participation, and (3) could be feasibly implemented.

The alternatives selection process considered multiple alternatives by the District. Certain alternatives were eliminated from consideration based on their inability to meet most of the Project's basic objectives, their infeasibility, or their inability to reduce the Project's environmental impacts. CEQA Guidelines Section 15364 defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." CEQA Guidelines Section 15126.6(f)(1) states that "the factors that may be taken into account when addressing the potential feasibility of alternatives include site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (or the site is already owned by the proponent)."

4.B.1 Project Objectives

As discussed in Chapter 2, Project Description, Section 2.C.3, Project Objectives, the purpose of the Project is to restore Alamitos Creek's stream function within the footprint of Almaden Lake Park (Park) to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the Almaden Lake (lake) footprint, and minimizing impacts to existing recreational features within Almaden Lake Park. This purpose would be accomplished through the following objectives:

- Separate Alamitos Creek from Almaden Lake.
- Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives.
- Remove potential lake entrainment of anadromous fish.
- Improve temperature conditions and reduce predation for native fish.
- Minimize impacts to existing recreational features.

The District is proposing this Project, which includes isolating Alamitos Creek from the lake and restoring its upstream and downstream connectivity, re-contouring the lake bottom and capping it with clean fill, expanding the Park into the existing lake and beach areas, expanding the existing island and constructing a new island, establishing vegetation, and connecting the lake to a water source.

Separating Alamitos Creek from Almaden Lake would restore Alamitos Creek's upstream and downstream connectivity within the Guadalupe River Watershed, restoring habitat linkages for native fish and threatened anadromous fish species, and would create a geomorphically stable creek channel that would improve sediment transport and restore natural creek functions. Therefore, the Project would help to restore and maintain healthy fish populations by improving fish habitat and passage in the creek channel.

Leveling the irregular lake bottom and capping existing elemental mercury in the lake bed would assist in addressing Almaden Lake's mercury-related water quality issues. Re-contouring the lake bottom, continuing effective control measures (e.g., operation of SolarBee solar powered circulators) to manage future methylmercury production and bioaccumulation in fish, and utilizing a water source that minimizes the reintroduction of mercury to the lake would promote the ability of the District to meet the water quality objectives laid out by the San Francisco Bay Regional Water Quality Control Board (RWQCB) in the 2008 Basin Plan Amendment (RWQCB, 2008).

4.B.2 Significant Environmental Impacts

This section summarizes the impacts of the Project, as analyzed in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures and Chapter 5, Cumulative Impacts, of this EIR, and that were considered during the alternatives identification process.

Long-Term Impacts

Project operation would not result in ~~the following~~ significant long-term impacts.~~, which could be mitigated to a less than significant level with the implementation of mitigation measures identified in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures:~~

- ~~*Noise.* The applicable City of San José (City) Municipal Code noise exposure limits for Project-related operational noise exposure is 55 dB DNL (day-night average level) at residential uses and 60 dB DNL at commercial uses in the Project vicinity. Estimated noise from the Project's water pump station along the northern end of the lake would generate a DNL of 61 dBA for the closest receptors at the residences in Almaden Lake Village. This value exceeds the operational noise threshold for residential uses and is, therefore, considered a significant impact (Impact 3.L-1, LSM).~~

Short-Term Impacts

All short-term construction impacts could be mitigated to a less than significant level with the implementation of mitigation measures identified in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures, except for aesthetic impacts to visual character of the Project site, which would be unavoidable. Project construction would result in the following significant short-term impacts:

- *Aesthetics.* Project related construction would diminish the visual character of the Project site until restoration planting are established. (Impact 3.A-3, SU)
- *Air Quality.* Project-related construction activities at the Project site may cause wind-blown dust that could emit particulate matter into the atmosphere. Equipment exhaust

could cause an exceedance of standards for nitrogen oxides (NO_X). Likewise, toxic air contaminants (TAC), namely diesel particulate matter (DPM), could cause a cancer risk in excess of Bay Area Air Quality Management District (BAAQMD) thresholds. If these impacts are not mitigated, the Project would be in violation of BAAQMD's 2017 Bay Area Clean Air Plan. (Impacts 3.C-1, 3.C-2, and 3.C-3, LSM).

- *Biological Resources.* Project construction activities could be disruptive to special-status birds – such as double-crested cormorant[1] and protected herons and egrets – nesting migratory birds and raptors, and roosting bats through the temporary removal of nesting, roosting, and foraging habitat and human activity (Impact 3.D-1, LSM).

  The removal or damage of street trees and trees would conflict with local policies related to tree removal or disturbance (Impact 3.D-6, LSM).

- *Fisheries Resources.* Dewatering and native fish relocation, has the potential to result in significant impacts of native fish species (Impact 3.E-1, LSM).

- *Cultural Resources and Tribal Cultural Resources.* Based on the records search, survey, and previous disturbance, there are ~~no~~ known archaeological resources and potential tribal cultural resources ~~or human remains~~ in the proximity of the connection pipeline, which would be constructed within an existing paved roadway ~~APE~~. There is a low potential for archaeological resources and human remains to be uncovered during ground disturbing activities due to the lack of known resources and disturbed nature of the Project area near known resources. Despite the low potential, the inadvertent discovery of archaeological resources, human remains, or tribal cultural resources cannot be entirely discounted. The possibility of inadvertent discovery would result in a significant impact (Impact 3.F-1, LSM).

- *Energy.* While the overall fuel use requirements would not be significant relative to the overall sales of fuels in the County, construction activities could result in wasteful or inefficient use of energy fuels. The potential for construction activities to use large amounts of fuel or energy in a wasteful or inefficient manner would be a significant impact (Impact 3.G-1, LSM).

- *Hydrology and Water Quality.* Construction of the Project would cause disturbance of bottom sediments during the draining of the lake stirring up mercury concentrated sediments. As this water is released from the lake to downstream receiving waters degrading water quality. (Impact 3.K-1, LSM).

  Project construction would result in the closure and draining of Almaden Lake, taking it out of commission for flood storage. Flood flows would be routed behind a diversion structure (i.e., sheet piles) enabling creek baseflow and stormwater to pass downstream. Unless properly designed, the diversion structure could result in a temporary constriction of flows in the creek. If a major storm event were to occur during the Project construction period, the temporary conveyance could be insufficient to pass flows downstream, which could result in accidental release of flows into the Almaden Lake work area, creating potential hazards to Project workers and construction equipment (Impact 3.K-3, LSM).

- *Noise.* Construction of the Project would exceed the applicable noise threshold criteria associated with off-site traffic if all Project construction traffic would access the site either via the Guadalupe River Trail from Coleman Road (north of Almaden Lake Village) or

[1] Double-crested cormorant is not special-status species, however, nesting colonies for the double-crested cormorant are on the CDFW Watch List and have previously been listed as a California species of special concern. As such, impacts to the cormorant are included herein.

Winfield Boulevard (south of Coleman Road) (worst-case scenarios); this construction impact would be considered significant (Impact 3.L-1, LSM).

Cumulative Impacts

Construction and operation of the Project would contribute to the significant cumulative impacts listed below. All cumulative impacts would be reduced to a less than cumulatively considerable level by mitigation measures identified in Chapter 5.

- *Air Quality.* Equipment exhaust could cause an exceedance of standards for nitrogen oxides (NO_X). If this impact is not mitigated, the Project would be in violation of BAAQMD's 2017 Bay Area Clean Air Plan.
- *Biological Resources.* Project construction activities could be disruptive to special-status birds – such as nesting colonies of double-crested cormorant and protected herons and egrets – nesting migratory birds and raptors, and roosting bats through the temporary removal of nesting, roosting, and foraging habitat and human activity. The removal or damage of street trees and trees would conflict with local policies related to tree removal or disturbance.
- *Fisheries Resources.* Dewatering and native fish relocation has the potential to result in significant impacts to native fish species.
- *Cultural Resources and Tribal Cultural Resources.* Based on the records search, survey, and previous disturbance, there are ~~no~~ known archaeological resources and potential tribal cultural resources ~~or human remains~~ in the proximity of the connection pipeline, which would be constructed within an existing paved roadway ~~APE~~. There is a low potential for archaeological resources and human remains to be uncovered during ground disturbing activities due to the lack of known resources and disturbed nature of the Project area near known resources. Despite the low potential, the inadvertent discovery of archaeological resources, human remains, or tribal cultural resources cannot be entirely discounted.
- *Energy. C*onstruction activities could result in wasteful or inefficient use of energy resources.
- *Noise.* Construction activities would contribute to the noise environment in the Project area. ~~The water pump station would contribute noise that could exceed allowable noise levels at nearby residents.~~

4.B.3 Approach to Alternatives Selection

The alternatives selection process for the Project was guided, in part, by the magnitude and severity of the impacts identified above. Therefore, this analysis focuses on action alternatives that could be implemented (i.e., are feasible), meet most of the Project objectives, and:

- Lessen or avoid short-term, construction-phase impacts~~; and/or~~
- ~~Lessen or avoid long-term, operational-phase impacts.~~

4.B.4 Selected CEQA Alternatives

This section describes the Project alternatives that were selected and analyzed in accordance with CEQA Guidelines Section 15126.6(a). The three alternatives to the Project selected for detailed analysis in this EIR are:

- Alternative 1: No Project Alternative
- Alternative 2: Creek with East and West Lakes Alternative. This alternative would implement a 100-foot wide restored creek section with a 5-acre lake to its west and a 22-acre lake to its east. Construction of this alternative would require approximately 70,000 cubic yards less fill material, and would have an approximately 4-month shorter construction period resulting in reduced significant construction-related, short-term impacts (less than significant with mitigation).
- Alternative 3: Creek with East and West Open Space Alternative. This alternative would create a new 100-foot wide restored creek with a 5-acre open space to its west and a 22-acre open space to its east. ~~This alternative would not require a pump station as it would not include a lake, eliminating the significant noise impact associated with pump station operation (less than significant with mitigation).~~

Table 4-1 provides a brief description of these alternatives and highlights how they differ from the Project. This section also evaluates the impacts of the selected alternatives relative to those of the Project. The evaluation is based on the available information and reasonable assumptions about how each alternative would be implemented. For each alternative, this section presents the following:

- A description of the alternative, including the rationale for its selection, and associated improvements and auxiliary components
- An evaluation of the alternative's ability to meet Project goals and objectives
- Analysis of the environmental impacts of each alternative compared to those of the Project

TABLE 4-1
SELECTED CEQA ALTERNATIVES

Alternative	How Does the Alternative Differ from the Project?
Alternative 1: No Project – The District would not restore the channel of Alamitos Creek, re-contour and cap the Almaden Lake floor, connect the lake to a water source, expand open space and island areas in Almaden Lake Park, and install riparian vegetation. The lake and Park would continue to operate as they currently do under existing conditions.	• The District would not construct a levee creating a geomorphically stable, self-sustaining channel for Alamitos Creek in addition to access ramps into the creek. • The District would not separate the lake area from the creek or construct a new boat launch ramp, and boat house. The lake bed would remain unnaturally varied. Elevated mercury levels in the water and fish tissue would continue, as well as high concentrations of coliform bacteria and blue-green algae. • The District would not expand the Park's open space area into the existing west beach and lake areas. • The District would not expand the existing island and create an additional island. • The District would not plant and maintain riparian vegetation around the lake, along the creek, and on the islands. • The District would not construct the Almaden Lake Source Water Connection <u>or</u> ~~with~~ the ~~Los~~ Alamitos Percolation Pond<u>/Los Capitancillos Percolation Ponds</u> to maintain water levels in the restored lake.

TABLE 4-1 (CONTINUED)
SELECTED CEQA ALTERNATIVES

Alternative	How Does the Alternative Differ from the Project?
Alternative 2: Creek with East and West Lakes – The District would separate Alamitos Creek from Almaden Lake by constructing two levees, re-contour and cap the Almaden Lake bed, and construct two lakes, one on either side of the creek.	• The District would not build a new park area on the west side of the creek. Instead, a small 5-acre lake would be included west of the creek (West Lake). Construction of this alternative would use approximately 70,000 cubic yards less fill material, and have an approximately 4-month shorter construction period. • Alamitos Creek would be restored in an approximately 5-acre, 100-foot wide creek channel. • A sediment catchment area would be constructed at the upstream end of the creek. The restored creek would have riparian vegetation planted along both creek banks. • Two levees would be constructed to separate the creek from Almaden Lake, and two lakes would exist on either side of the creek. The East Lake would be approximately 22 acres, and the West Lake would be approximately 5 acres. • Separate inlets and outlets for imported water would be created in the two lakes. A single pipeline would carry imported water from the Almaden Valley Pipeline. This pipeline would split just south of the lakes to supply water to the two separate lakes. Approximately 80 percent of the imported water would flow into the larger East Lake and approximately 20 percent would flow into the smaller West Lake. • As part of the flow-through water management system, each lake would have its own separate outlet structure at the north end of the lakes. Two pump stations and two outlet pipelines would be constructed. The two outlet pipelines from the lakes would converge just north of the lakes into a single pipeline conveying overflow water to the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds for groundwater recharge. Of the 4,350 AFY of potentially diverted overflow water, approximately 80 percent would flow from the larger East Lake and approximately 20 percent would flow from the smaller West Lake. The capacity of the West Lake pump station would be smaller than the East Lake pump station. • Up to five SolarBees would circulate water in the East Lake, and up to two SolarBees would circulate water in the West Lake.
Alternative 3: Creek with East and West Open Space – The District would separate Alamitos Creek from Almaden Lake. The remaining Almaden Lake area would be filled to create new open space areas on either side of the creek.	• The District would separate Alamitos Creek from Almaden Lake and fill the remaining lake area creating new open space areas to the east and west of the creek. Construction of this alternative would use approximately 100,000 cubic yards more fill material than the Project. • Operation of Alternative 3 would not require a pump station as there would be no lake~~, resulting in the elimination of the less than significant with mitigation operational noise impact of the Project.~~ • Eliminates lake feature and recreational opportunities for pedal boating at Park. • Alamitos Creek would be restored in an approximately 5-acre, 100-foot wide creek channel. • Two creek banks would be constructed to restore the creek, and remaining lake areas on either side of the creek would be filled to ground level with clean fill. The east open space would be approximately 22 acres, and the west open space would be approximately 5 acres. • A sediment catchment area would be constructed at the upstream end of the creek. The restored creek would have riparian vegetation planted along both creek banks. • Clean fill in the former lake area would cover existing mercury-laden sediment. New open space areas would be planted with grass and trees and may be dedicated to the City for potential recreational development. • A maintenance road along the east creek embankment would provide maintenance access to the creek.

Table 4-2 summarizes the environmental impacts of the selected alternatives compared to those of the Project.[2] None of the action alternatives would reduce any of the Project's significant impacts or cumulatively considerable impacts (pre-mitigation) to less than significant levels.

[2] The action alternatives would also contribute to significant cumulative impacts for the following resources: air quality, biological resources, fisheries resources, cultural and tribal resources, energy, and noise.

TABLE 4-2
COMPARISON OF THE ENVIRONMENTAL IMPACTS OF THE CEQA ALTERNATIVES

Impact	Project	Alternative 1: No Project	Alternative 2: Creek with East and West Lakes	Alternative 3: Creek with East and West Open Space
Impact 3.A-3: The Project would substantially degrade the existing visual character or quality of public views of the site and its surroundings and would not conflict with applicable zoning and other regulations governing scenic quality.(Significant and Unavoidable)	Project related construction would diminish the visual character of the Project site until restoration planting are established. (SU)	No Impact There would be no construction activities that could diminish the visual character of the Project site, and eliminate/alter views of the Lake.	Decreased Similar to the Project, Alternative 2 would result in diminished visual character of the Project site until restoration planting is established; however, the overall project construction timeline would be reduced compared to the Project. (SU)	Increased Alternative 3 would result in diminished visual character during construction and would import and place considerably more fill material than the Project to fill Almaden Lake; thus, Alternative 3 would likely require a longer construction timeline compared to the Project. (SU) Alternative 3 would remove Almaden Lake, resulting in a permanent change in overall visual character; from views of open water under existing conditions to views of a creek and landscaped areas under Alternative 3. (SU)
Impact 3.C-1: The Project would conflict with or obstruct implementation of the applicable air quality plan. (Less than Significant with Mitigation)	Project-related construction activities would include the use of diesel-powered construction equipment. To meet the 2017 Bay Area Clean Air Plan (CAP), the Project would need to meet CAP incentives and BAAQMD CEQA thresholds of significance. (LSM)	No Impact There would be no construction using diesel-power equipment or causing soil disturbance.	Similar Similar to the Project, Alternative 2 would support the primary goals of the 2017 CAP, and would not conflict with the applicable air quality plan. (LSM)	Increased Alternative 3 would import and place considerably more fill material than the Project to fill Almaden Lake. Construction would result in increased criteria pollutant emissions as well as increased emissions of fugitive dust, which could conflict with the primary goals of the 2017 CAP. (LSM – SU)
Impact 3.C-2: The Project would result in a cumulatively considerable net increase of a criteria pollutant for which the San Francisco Bay Area Air Basin is in non-attainment under applicable federal and state ambient air quality standards. (Less than Significant with Mitigation)	Criteria pollutant emissions of reactive organic gases (ROG), NO_X, PM_{10}, and $PM_{2.5}$ from construction equipment, worker trips, vendor trips, hauling trips, and locomotives associated with removed lake bed sediment via railroad could incrementally add to the regional atmospheric loading of these pollutants during construction of the Project. The use of on- and off-site construction equipment would cause an exceedance of the NO_X threshold.	No Impact There would be no construction using diesel-power equipment to generate these criteria pollutants, or construction activity creating wind-blown dust that would generate particulate matter.	Decreased By forgoing the new park area, Alternative 2 would utilize approximately 70,000 cubic yards less fill material than the Project resulting in a 4-month shorter construction period. As a result, this alternative would generate less construction-related NOx emissions than the Project. (LSM)	Increased Alternative 3 would import and place considerably more fill material than the Project to fill Almaden Lake. Transporting and placing this increased amount of fill material would result in increased criteria pollutant emissions as well as increased emissions of fugitive dust associated with construction activities. (LSM – SU)

TABLE 4-2 (CONTINUED)
COMPARISON OF THE ENVIRONMENTAL IMPACTS OF THE CEQA ALTERNATIVES

Impact	Project	Alternative 1: No Project	Alternative 2: Creek with East and West Lakes	Alternative 3: Creek with East and West Open Space
Impact 3.C-2 (cont.)	In addition to exhaust emissions, emissions of fugitive dust would also be generated by Project-related construction activities associated with grading and earth disturbance, travel on paved and unpaved roads, and other construction related activities, requiring dust control measures. (LSM)			
Impact 3.C-3: The Project would expose sensitive receptors to substantial pollutant concentrations (Less than Significant with Mitigation).	Project-related construction activities would include the use of diesel-powered construction equipment that would emit toxic air contaminants (TAC), namely diesel particular matter (DPM). The exposure risk would be 23.1 in 1.0 million, in exceedance of the BAAQMD thresholds of 10 in 1.0 million. (LSM)	No Impact There would be no construction using diesel-power equipment to generate TACs.	Decreased Alternative 2 would have a shorter construction period than the Project, and would generate fewer diesel-powered construction equipment trips resulting in lower emissions of TACs and lower levels of exposure to sensitive receptors. (LSM)	Increased Alternative 3 would require the importing and placing considerably more fill than the Project, and would generate more diesel-powered construction equipment trips resulting in increased emissions of TACs and increased levels of exposure to sensitive receptors. (LSM)
Impact 3.D-1: Construction or operation of the Project would have a substantial effect on special-status birds, common nesting migratory birds and raptors, and roosting bats in the Study Area. (Less than Significant with Mitigation).	Project construction activities could be disruptive to special-status birds, nesting migratory birds and raptors, and roosting bats through the temporary removal of nesting, roosting, and foraging habitat and human activity. (LSM)	No Impact There would be no earth-moving activities or removal of trees or other construction activities that would be disruptive to special-status birds, nesting migratory birds and raptors, and roosting bats.	Decreased Construction of Alternative 2 would be somewhat less disruptive to special-status birds, nesting migratory birds and raptors, and bats than the Project. Construction activities such as earthwork, fugitive dust, noise, vibrations, visual disturbance, and human activity would be somewhat lessened under this alternative. Ground disturbance activities associated with pipeline construction may be somewhat more extensive under this alternative. (LSM)	Increased Construction of Alternative 3 would be more disruptive to special-status birds, nesting migratory birds and raptors, and bats than the Project. Construction activities such as earthwork, fugitive dust, noise, vibrations, visual disturbance, and human activity would be increased under this alternative compared to the Project. Converting the lake to open space area would remove lacustrine and freshwater marsh habitat from the Project area, which would be detrimental to species reliant on aquatic habitats. (LSM)

TABLE 4-2 (CONTINUED)
COMPARISON OF THE ENVIRONMENTAL IMPACTS OF THE CEQA ALTERNATIVES

Impact	Project	Alternative 1: No Project	Alternative 2: Creek with East and West Lakes	Alternative 3: Creek with East and West Open Space
Impact 3.D-6: The Project would conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less the Significant with Mitigation)	Project construction activities would result in the removal or damage of street trees and trees within parks, and would conflict with local policies related to tree removal or disturbance. (LSM)	No Impact There would be no construction-related disruption of street trees and trees within parks, and no conflict with local policies related to tree removal or disturbance.	Similar Alternative 2 construction activities would result in the removal or damage of street trees and trees within parks, and would conflict with local policies related to tree removal or disturbance, similar to the Project. (LSM)	Decreased Alternative 3 construction activities would not include disturbance associated with pipeline corridors. Removal or damage of street trees and trees within parks would be confined to the Park and creek inlet/outlet, resulting in somewhat decreased tree disturbance and decreased conflict with local policies related to tree removal or disturbance. (LSM)
Impact 3.E-1: Construction and operation of the Project would have a substantial effect on special-status native fish and their aquatic habitat in Almaden Lake and Alamitos Creek. (Less than Significant with Mitigation)	Dewatering and subsequent construction, including relocation of native fish, has the potential to result in significant impacts on native fish species. (LSM)	No Impact No construction-related disruption to special-status fish and their aquatic habitat. Adverse Impact Current mercury contamination would continue in the lake, which is in exceedance of RWQCB water quality standards, and numeric targets for fish tissue mercury concentrations would continue to be in exceedance of mercury thresholds. Lake and creek aquatic habitats would continue to be intermingled, resulting in the continuation of poor aquatic habitat for special-status fish.	Similar Alternative 2 would undertake similar creek habitat restoration activities that would require dewatering and subsequent construction with the potential to result in significant impacts on native fish species. Similar to the Project, however, overall post-Project conditions should provide substantial benefit to native fish species through the restoration of the system to a more natural state. Because Alamitos Creek would be confined to a narrower corridor under Alternative 2, the habitat quality of the restored creek channel would likely to lower under this alternative as compared to the Project. (LSM)	Similar Alternative 3 would undertake similar creek habitat restoration activities that would require dewatering and subsequent construction with the potential to result in significant impacts on native fish species. Similar to the Project, however, overall post-Project creek conditions should provide substantial benefit to native fish species through the restoration of the system to a more natural state. Because Alamitos Creek would be confined to a narrower corridor under Alternative 3, the habitat quality of the restored creek channel would likely be lower under this alternative as compared to the Project. (LSM)
Impact 3.F-1: The Project would cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5, human remains, or a tribal cultural resource defined in Section 21074. (Less than Significant with Mitigation)	Based on the records search, survey, and previous disturbance, there are ~~no~~ known archaeological resources and potential tribal cultural resources ~~or human remains~~ in the proximity of the connection pipeline, which would be constructed within an existing paved roadway ~~area of potential effects (APE~~). There is a low potential for archaeological resources and human remains to be uncovered during ground disturbing activities due to the lack of known resources and disturbed nature of the Project area near known resources. Despite the low potential, the inadvertent	No Impact There would be no construction that would inadvertently expose significant archaeological materials, disturb human remains, or tribal cultural resources.	Similar Alternative 2 would have the same low potential for inadvertent discovery of archaeological resources, human remains, or tribal cultural resources during ground disturbing activities as the Project. (LSM)	Decreased Alternative 3 would have less potential for inadvertent discovery of archaeological resources, human remains, and tribal cultural resources during ground disturbing activities than the Project, because the lake would not be graded and would not involve the installation of pipelines to supply water to the lake. (LSM)

TABLE 4-2 (CONTINUED)
COMPARISON OF THE ENVIRONMENTAL IMPACTS OF THE CEQA ALTERNATIVES

Impact	Project	Alternative 1: No Project	Alternative 2: Creek with East and West Lakes	Alternative 3: Creek with East and West Open Space
	discovery of archaeological resources, human remains, or tribal cultural resources cannot be entirely discounted. The possibility of inadvertent discovery would result in a significant impact. (LSM)			
Impact 3.G-1: The Project would result in wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation (Less than Significant with Mitigation)	While the overall fuel use requirements would not be significant relative to the overall sales of fuels in the County, construction activities could result in wasteful or inefficient use of energy fuels. The potential for construction activities to use large amounts of fuel or energy in a wasteful or inefficient manner would be a significant impact. (LSM)	No Impact No wasteful, inefficient, or unnecessary consumption of energy resources during Project construction.	Decreased Alternative 2 would require a shorter construction period than the Project resulting in less potential for construction activities to result in wasteful or inefficient use of energy resources. (LSM)	Increased Alternative 3 would require a longer construction period than the Project resulting in greater potential for construction activities to result in wasteful or inefficient use of energy resources. (LSM)
Impact 3.K-1: The Project would violate water quality standards or waste discharge requirements, conflict with or obstruct implementation of the Basin Plan, or otherwise substantially degrade surface or groundwater quality. (Less than Significant with Mitigation)	Construction of the Project would cause disturbance of bottom sediments during the draining of the lake stirring up mercury concentrated sediments. As this water is released from the lake to downstream receiving waters degrading water quality. (LSM) The Project would have a net benefit to water quality in the lake by reducing elemental mercury concentrations and greatly alleviating methylmercury production in Almaden Lake, reducing algal concentrations, improving dissolved oxygen levels, and reducing or removing select sources of nutrients to the lake. (Beneficial)	No Impact There would be no construction activities that would cause violation of water quality standards. Adverse Impact The current water quality issues of mercury contamination, low dissolved oxygen, coliform bacteria, and algal blooms would remain.	Similar Alternative 2 would have the same impacts associated with draining the lake. (LSM) Similar Operation of Alternative 2 would similarly have a net benefit on water quality in the lake. (Beneficial)	Similar Construction of Alternative 3 would have the same impacts associated with draining the lake. (LSM) No Impact Alternative 3 would convert Almaden Lake to open space. Lake water would be permanently removed. Operational lake water quality would be irrelevant. (NI)
Impact 3.K-3: The Project would substantially alter the existing drainage patterns of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which could: (i) result in substantial erosion or siltation offsite; (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or offsite; (iii) create or contribute runoff water which would exceed the	During Project construction, the lake would not be utilized for flood storage. Flood flows would be routed behind sheet piles, enabling creek baseflow and stormwater to pass downstream. Unless properly designed, the diversion structure could result in a temporary constriction of flows in the creek. If a major storm event were to occur during construction, the temporary conveyance could be insufficient to pass flows downstream, which could result in accidental release of flows into	No Impact There would be no change in stormwater capture and flood flow conveyance at the lake and Park.	Increased This alternative would have a narrower creek channel in which to temporarily convey stormwater flows. In the event of a major storm event during construction, the narrower creek channel would have an increased potential for the conveyance to be insufficient to pass stormwater flows downstream, which could result in accidental release of flows into the lake work areas, creating increased	Increased This alternative would have a narrower creek channel in which to temporarily convey stormwater flows. In the event of a major storm event during construction, the narrower creek channel would have an increased potential for the conveyance to be insufficient to pass stormwater flows downstream, which could result in accidental release of flows into the adjacent open space work areas,

TABLE 4-2 (CONTINUED)
COMPARISON OF THE ENVIRONMENTAL IMPACTS OF THE CEQA ALTERNATIVES

Impact	Project	Alternative 1: No Project	Alternative 2: Creek with East and West Lakes	Alternative 3: Creek with East and West Open Space
capacity of existing planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or (iv) impede or redirect flood flows. (Less than Significant with Mitigation)	the lake work area, creating potential hazards to Project workers and construction equipment. (LSM)		potential hazards to Project workers and construction equipment. (LSM)	creating increased potential hazards to Project workers and construction equipment. (LSM)
Impact 3.L-1: The Project would generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. (Less than Significant with Mitigation)	The City's General Plan establishes that residential uses within 500 feet of construction, and commercial uses within 200 feet of construction, may be adversely affected by construction noise. Existing residences to the north, west, and east of the Project site are located within 500 feet of the construction activities and could be significantly affected by Project-related construction noise. (LSM) In addition, construction of the Project would exceed the applicable noise threshold criteria associated with off-site traffic if all Project construction traffic would access the site either via the Guadalupe River Trail from Coleman Road (north of Almaden Lake Village) or Winfield Boulevard (south of Coleman Road) (worst-case scenarios); this construction impact would be considered significant. (LSM) ~~The applicable City of San José Municipal Code noise exposure limits for Project-related operational noise exposure is 55 dB DNL at residential uses and 60 dB DNL at commercial uses in the Project vicinity. Estimated noise from the Project's water pump station along the northern end of the lake would generate a DNL of 61 dBA for the closest receptors at the residences in Almaden Lake Village. This value exceeds the operational noise threshold for residential uses. (LSM)~~	No Impact There would be no construction noise impacts or permanent impacts from the use of the Park and lake, beyond that currently existing.	Decreased The same construction equipment would be used for this alternative as for the Project. However, Alternative 2 would have a four-month shorter construction period. With a shorter construction period, there would be a decrease in the use of equipment that could exceed the noise limits of the City's General Plan and the applicable noise threshold criteria associated with off-site traffic in the vicinity of the Guadalupe River Trail and Winfield Boulevard near Coleman Road. (LSM) ~~Similar~~ ~~Under the flow-through water management system, Alternative 2 would require two pump stations to pump water from the two lakes, as compared to one pump station proposed under the Project. However, the two pump stations would have a smaller capacity than the pump station proposed under the Project due to the reduced pumping requirements of the two lakes under Alternative 2. As a result, the noise generated by the two pump stations under Alternative 2 would be similar to the operational noise of the Project's pump station. (LSM)~~	Increased Similar construction equipment would be used for this alternative as for the Project. Alternative 3 would require considerably more fill material than the Project, resulting in a longer construction period. With a longer construction period, there would be an increase in the use of equipment that could exceed the noise limits of the City's General Plan and the applicable noise threshold criteria associated with off-site traffic. (LSM) ~~No Impact~~ ~~Alternative 3 would convert Almaden Lake to open space, and would not require a pump station to convey lake water. Operation of this alternative would not involve the use of pumps resulting in the elimination of the operational noise impact. (NI)~~

Alternative 1: No Project Alternative

CEQA Guidelines Section 15126.6(e) requires that EIRs include an evaluation of the No Project Alternative to provide decision-makers the information necessary to compare the relative impacts of approving the Project and not approving the Project. The No Project Alternative is defined as a continuation of existing conditions, as well as conditions that are reasonably expected to occur in the event that the Project is not implemented.

Description of the No Project Alternative

In the event that the District does not approve the Project, the restoration of Alamitos Creek and Almaden Lake would not occur. The open area in the Park and the existing island in the lake would not be expanded, and the additional island would not be created. The flow-through water management system from Almaden Valley Pipeline to the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds would not be constructed. Restoration of levees, banks, and islands would not occur. Without these components in place, existing non-physical barriers to anadromous fish would remain in place and anadromous fish would continue to be subject to predation by warm water predators in the lake. Finally, the lake would remain in violation of the San Francisco Bay Regional Water Quality Control Board's total maximum daily load (TMDL) for mercury and site-specific objectives for mercury in fish tissue. It would continue to experience high concentrations of coliform bacteria and blue-green algae blooms. Current prohibitions on water-based activities at and in the lake would remain in force based on water quality testing.

Ability to Meet Project Objectives

The No Project Alternative would not meet any of the project objectives, which are to: separate Alamitos Creek from Almaden Lake; reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives; remove potential lake entrainment of anadromous fish; improve temperature conditions and reduce predation for native fish; and minimize impacts to existing recreational features. The current high levels of mercury and coliform bacteria, low dissolved oxygen concentrations, and blue-green algae blooms would continue and further prohibit uses of the lake, such as swimming. Guadalupe River, Almaden Lake, and Alamitos Creek would continue to be poor habitat for fish passage to upstream spawning habitat in the Alamitos Creek watershed.

Environmental Impacts of the No Project Alternative Compared to those of the Project

As summarized in Table 4-2, the No Project Alternative would have adverse effects on the environment as the existing water quality issues would continue, including mercury contamination, low dissolved oxygen, coliform bacteria, and algal blooms. In addition to water quality impacts, existing adverse effects to biological resources (fisheries) and recreational opportunities in the lake and at the Park would continue. Current mercury contamination would continue, which is in exceedance of RWQCB water quality standards, and numeric targets for fish tissue mercury concentrations would continue to be in

exceedance of mercury thresholds. Also, existing barriers to anadromous fish migration would continue.

The No Project Alternative would avoid all construction-related short-term impacts, because Alamitos Creek would not be separated from the lake, Almaden Lake would not be recontoured and capped, the open park area and new boating facilities would not be created, the island in the lake would be unchanged, a flow-through water system would not be constructed, and the levee and trail/maintenance road would not be constructed. Thus, the vista of the lake from the Park would be maintained (Impact 3.A-3). Plantings to restore the riparian corridor along the Alamitos Creek channel would not be required. There would be no potential to cause wind-blown dust that could generate particulate matter or use of diesel-powered construction equipment emitting criteria pollutants and violate air quality standards (Impacts 3.C-1, 3.C-2, and 3.C-3); no disruption to protected wildlife species or removal/damage of street trees and trees within parks (Impacts 3.D-1 and 3.D-6); no construction-related disruption to special-status fish (Impact 3.E-1); no potential to encounter significant archaeological resources, human remains, or tribal cultural resources (Impact 3.F-1); no wasteful, inefficient, or unnecessary consumption of energy resources during Project construction (Impact 3.G-1); no construction activity that could cause a disturbance of sediments, release water with elevated mercury levels, or use hydrocarbons and other potential pollutants (Impact 3.K-1), no ground disturbance that could change drainage patterns, flood storage or flood flows, or increase soil erosion (Impact 3.K-3); and no construction activities ~~or pump operation~~ to exceed noise ordinance standards (Impact 3.L-1).

Alternative 2: Creek with East and West Lakes

The intent of Alternative 2 would be to reduce the short-term, construction-related impacts of the Project while fulfilling the project objectives. Alternative 2 would include the separation of Alamitos Creek from Almaden Lake, and the re-contouring and capping of the lake bottom. However, Alternative 2 would feature open water lake areas on both sides of the restored Alamitos Creek alignment (Figure 4-1), instead of a single lake to the east of the creek and new parkland to the west of the creek as proposed under the Project.

Because the West Lake area would be open water and not new park land, the amount of required fill would be reduced by nearly 70,000 cubic yards (from about 897,690 cubic yards under the Project [see Table 2-2 in Chapter 2, Project Description]). In addition, the construction period under Alternative 2 would be approximately 4 months less than under the Project (26 months as compared to 30 months under the Project), and construction-related impacts would be proportionately reduced.



SOURCE: SCVWD, 2012

Almaden Lake Improvement Project . 130679

Figure 4-1

Alternative 2: Creek with East and West Lakes

Description of Alternative 2

Alamitos Creek Restoration

Under Alternative 2, Alamitos Creek would be restored in an approximately 100-foot wide by 1,600-foot long riparian corridor. The approximately 5-acre creek channel would be separated from Almaden Lake, and sized to convey a 100-year flood event. Alternative 2 would have a narrower channel than the 210 to 420-foot wide flood channel and 11-acre creek area of the Project. The geomorphic design of the creek channel would include a riffle-pool-run pattern similar to the channel immediately upstream of the Project area. The restored creek channel would be bordered by levees on its east and west banks (as compared to a levee on just the east bank under the Project), and the eastern levee would be approximately 20-feet wide with a maintenance road and public trail along the top. A sediment catchment area at the upstream end of the creek, where sediment would be allowed to deposit, would slow the stream flow and promote sediment deposition.

Similar to the Project, this alternative would install ~~two~~ creek access ramps intended for use only by the District's operation and maintenance staff. Native riparian vegetation would be planted along both sides of the restored creek corridor providing shading and lower water temperatures for cold water fish. Native plantings would be consistent with the District's Water Resources Protection Manual (SCVWD, 2006).

Almaden Lake Restoration

The entirety of Almaden Lake would be re-contoured under Alternative 2, and existing mercury-laden sediment would be capped with at least 2.5 feet of clay/levee fill material. The re-contoured lake depth would be approximately 26 to 28 feet, similar to the Project. Under this alternative, Almaden Lake would comprise an approximately 22-acre East Lake and an approximately 5-acre West Lake on either side of the restored Alamitos Creek channel, as compared to a single approximately 17-acre lake east of the creek under the Project.

In the East Lake, the existing island's outer banks would be re-contoured to promote greater stability of the island, and the island would be resized to an approximately 0.75-acre area, similar to the Project. A second 0.75-acre island would be created just north of the existing island. Alternative 2 would include revegetating the banks of the lakes and the islands with riparian vegetation. Public access to the islands would be prohibited. Similar to the Project, the existing boat house and boat launch would be relocated to East Lake's eastern bank (Figure 4-1).

Almaden Lake Water Supply

In both the East and West lakes, a lake water level ranging from about 188 to 190 feet above mean sea level (msl) would be maintained, similar to the Project. The lake levels would be maintained with a flow-through management system circulating at least 4,350 AFY of water through the lakes: approximately 7.5 cubic feet per second (cfs) from May through September and approximately 5.0 cfs from October through April. The pipelines would be sized to convey flows of up to 16 cfs of water (12 to 14 cfs into the East Lake, and 2 to 4 cfs into the West Lake).

Similar to the Project, imported water from the Almaden Valley Pipeline would provide water to the lakes to enhance water circulation and water quality. A pipeline would run from the Almaden Valley Pipeline approximately a half-mile ~~(about 2,900 feet)~~ to Almaden Lake. Just south of the lakes, a single connector pipeline would split into two inlet pipelines to supply water to the two separate lakes, compared to a single ~~2,900-foot~~ inlet pipeline into one lake under the Project. Up to five SolarBees would circulate water in the East Lake, and up to two SolarBees would circulate water in the West Lake to enhance water quality, similar to seven SolarBees operating in a single lake in the Project.

As part of the flow-through management system, lake water would discharge via separate outlet pipelines from the northerly ends of the East and West lakes and converge in a single pipeline conveyance to the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds for groundwater recharge. Two separate outlet structures would be built at the north ends of the two lakes, including two pump stations and two outlet pipelines sized to convey approximately 16 cfs of water (12 to 14 cfs from the East Lake and 2 to 4 cfs from the West Lake). Under the Project, a single outlet structure, pump station, and pipeline would discharge water in a pipeline sized to convey 16 cfs of water to the ~~Los~~ Alamitos Percolation/Los Capitancillos Percolation Ponds Pond. Adequate capacity would need to be available in the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds in order to transfer water from the lakes to the percolation ponds for groundwater recharge, similar to the Project.

Alternative 2 Construction

Construction activities would be somewhat less than those anticipated by the Project due to the replacement of the new park area proposed under the Project with a lake area west of the creek under this alternative. As a result, Alternative 2 would use approximately 70,000 cubic yards less fill material and have about an approximately 4-month shorter construction period.

Similar to the Project, flow from the creek would be diverted around the construction area using a cofferdam and pumps, and the lake bed would be dewatered using portable diesel or electric pumps. A series of sheet piles would be installed along the alignments of the levees on either side of Alamitos Creek. Lake bed grading and levee construction may require additional dewatering of shallow lake sediments using sump pumps, well points, etc.

Similar to the Project, excavation activities for Alternative 2 include re-contouring the bed of Almaden Lake and Alamitos Creek, preparing the foundations of the levees, reconfiguring/ cutting the existing banks of Almaden Lake, reconfiguring the shape of the existing island and creating a new island, and trenching for the pipeline extensions to the Almaden Valley Pipeline connection and to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds. Total fill volume is estimated to be approximately 70,000 cubic yards less fill material than under the Project.

Ability to Meet Project Objectives

The Creek with East and West Lakes Alternative would meet all of the project objectives, which are to separate Alamitos Creek from Almaden Lake; reduce production of methylmercury,

and mercury in target fish in Almaden Lake to meet applicable water quality objectives; remove potential lake entrainment of anadromous fish; improve temperature conditions and reduce predation for native fish; and minimize impacts to existing recreational features. Alternative 2 would separate Alamitos Creek from Almaden Lake with the construction of two levees, and create two lakes on either side of the creek. By separating the creek from the lake, recontouring and capping the lake bottom, creating a flow-through water system for the lake, and piping overflow lake water to the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds, Alternative 2 would reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives. Lake water quality would be further enhanced by the circulation of up to seven SolarBee water circulators in the lakes. By isolating the creek channel from the lake, Alternative 2 would remove potential lake entrainment of anadromous fish and reduce release of Almaden Lake's warm water downstream into the Guadalupe River. Alternative 2 would minimize impacts to existing recreational features by continuing to provide pedal boating, picnicking, walking/running, hiking, biking, volleyball, horseshoes, bocce ball, dog walking, and other recreational activities.

Alternative 2 would also meet the project purpose to restore Alamitos Creek's stream function within the footprint of Almaden Lake to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint, and minimizing impacts to recreational features within the Park. Many and varied recreational opportunities would continue to be available in the Park. However, because Alternative 2 would not include a new park area west of the creek, continued recreation use of Almaden Lake Park would be somewhat less enhanced under Alternative 2 as compared to the Project.

Environmental Impacts of Alternative 2

As summarized in Table 4-2, implementation of the Creek with East and West Lakes Alternative would reduce the duration of the short-term, construction-related impacts compared to those of the Project because the area west of Alamitos Creek would be redeveloped as a lake area (i.e., West Lake) and would not be filled and converted into a new park area, as proposed under the Project. As a result, Alternative 2 would utilize approximately 70,000 cubic yards less fill material and construction of this alternative would be about 4 months shorter than the Project (about 26 months instead of 30 months).

Because this alternative would require less fill, and would take place over a shorter construction period, the construction-related impacts of Alternative 2 would be reduced compared to the Project. The mitigation measures described for the Project would also be applicable to Alternative 2.

The vista of the lake from the Park, which is the main visual element in the fore and middle ground, would be diminished compared to existing conditions, as under the Project (Impact 3.A-3). However, because the construction period would be shorter than for the project, the site would be restored after restoration plantings are established more quickly than under the Project. As under the Project, there is no feasible mitigation to reduce or avoid construction phase effects on the visual character of the Project site. Construction-related activities including operation of construction equipment, worker trips, and hauling

trips would be reduced, resulting in reduced criteria air pollutant emissions, including NOx, as compared to the Project (Impacts 3.C-1 and 3.C-2). Similarly, average construction emissions would be reduced as a result of less diesel-powered construction activity under Alternative 2 compared to the Project resulting in somewhat lower exposure of maximally exposed individual (MEI) receptors to toxic air contaminants and a related reduction in health risks (Impact 3.C-3).

Construction activities such as earthwork, fugitive dust, noise, vibrations, visual disturbance, and human activity would be somewhat lessened under this alternative due to a shorter construction period. As a result, Alternative 2 would be somewhat less disruptive to special-status birds, and nesting migratory birds and raptors, bats than the Project (Impact 3.D-1). Alternative 2 would affect the same general footprint as the Project, and would therefore have similar impacts as the Project on removal/damage of street trees and trees within parks (Impact 3.D-6). However, ground disturbance activities associated with pipeline construction would be somewhat more extensive under this alternative due to the need to create inlet and outlet pipelines for two lakes, potentially creating additional short-term disruptions of habitat.

With respect to special-status fish species and fish passage, Alternative 2 would undertake similar habitat restoration activities as the Project that would require dewatering of habitat, fish relocation, and subsequent reconstruction of the creek channel with the potential toresult in significant impacts on native fish species (Impact 3.E-1). Similar to the Project, however, overall post-Project conditions should provide substantial benefit to native fishspecies through the restoration of the creek system to a more natural state. Nevertheless, Alternative 2 would provide lower quality creek habitat for special-status fish species than the Project. Alternative 2 would provide only one-half of the area for the restoration of Alamitos Creek (5 acres, as compared to ~~11~~ 10 acres under the Project). This alternative would convey 100-year flood flows in a narrower and more steeply sloped creek channel (100 feet wide, as compared to the 210 to 420-foot wide flood channel of the Project). The narrower confines of this alternative's creek channel would provide less opportunity for Alamitos Creek to naturally meander in the corridor, and would restrict the creek's ability to create the complex and diverse ripple, pool, run riparian habitat beneficial to anadromous fish as compared to the Project. In addition, routine sediment removal activities in the vicinity of the in-creek sediment catchment area could be detrimental to anadromous fish habitat.

As with the Project, Alternative 2 would have a similar low potential for inadvertent discovery of archaeological resources, human remains, and tribal cultural resources during ground disturbing activities as the Project (Impact 3.F-1). Alternative 2 and the Project would require similar cut volumes of soils, resulting in similar levels of ground disturbance.

With respect to consumption of energy resources, Alternative 2 would require a shorter construction period than the Project resulting in less potential for construction activities to result in wasteful or inefficient use of energy resources, as compared to the Project (Impact 3.G-1).

Similar to the Project, Alternative 2 would improve water quality in Alamitos Creek and Almaden Lake. Like the Project, construction activities under this alternative would cause disturbance of sediments, release of water with elevated mercury levels, and use of construction machinery that releases hydrocarbons and other potential water quality pollutants. Alternative 2 would have a shorter construction period, and would reduce the time period that heavy construction equipment would be operating in the Project area and the potential for accidental release of water quality pollutants into the environment (Impact 3.K-1).

With respect to stormwater flows, this alternative would have a narrower creek channel in which to temporarily convey stormwater flows than the Project. In the event of a major storm event during construction, the narrower creek channel under this alternative would have an increased potential for the creek conveyance to be of insufficient capacity to pass stormwater flows downstream, which could result in accidental release of flows into the lake work areas, creating increased potential hazards to Project workers and construction equipment (Impact 3.K-3).

The shorter construction period under Alternative 2 would result in less construction equipment / traffic that would exceed the noise limits of the City's General Plan and exceed applicable threshold criteria associated with off-site construction traffic than the Project. This alternative would build two pump stations (an East Lake pump station and a West Lake pump station) to convey water from the lakes, as compared to one pump station under the Project. However, the two pump stations would have a smaller capacity than the pump station proposed under the Project due to the reduced pumping requirements of the two lakes under Alternative 2. As a result, the noise generated by the two pump stations under Alternative 2 would be similar to the operational noise of the Project's pump station (Impact 3.L-1).

In summary, this alternative would change the distribution of creek and lake restoration areas. The Alamitos Creek restoration area would be reduced to a five-acre area (as compared to ~~11~~ 10 acres under the Project). The narrower creek corridor (100 feet wide, as compared to 210 to 420-feet wide) under this alternative would require a deeper, less complex creek system to convey 100-year flood flows and more artificial hardscape features to control erosion, resulting in lower quality creek habitat for anadromous fish than the Project. The duration of the construction impacts under Alternative 2 would be less than those under the Project, because this alternative would require the placement of approximately 70,000 cy less fill material. An approximately 4-month shorter construction period would result in reduced construction-related impacts to air quality, biological resources, energy resources, hydrology and water quality, and noise-related impacts. However, ground disturbance associated with pipeline construction would be somewhat greater under this alternative (to provide a flow-through system for two separate lakes), potentially creating additional short-term disruptions of habitat. All of the significant construction-related impacts of the Project would remain significant under this alternative. However, the magnitude of the significance would generally be less, and all of the impacts would be reduced to a less than significant level with implementation of the same mitigation measures specified in this EIR for the Project, with the exception of construction phase aesthetic resources effects which would remain significant and unavoidable, similar to the Project.

Alternative 3: Creek with East and West Open Space

The intent of Alternative 3 would be to reduce tree removal within the park. ~~eliminate the operational noise impact of the pump station under the Project while fulfilling the project objectives~~. Alternative 3 would restore the Alamitos Creek alignment in a 5-acre corridor, and would address ongoing water quality issues in Almaden Lake by filling the lake and creating new park/open space areas to the east and west of the creek (Figure 4-2), instead of a single lake to the east of the creek and new parkland to the west of the creek as proposed under the Project.

The entire lake area would be converted to open space park land, with the exception of the 5-acre Alamitos Creek channel. In addition, the new park area to the west of the creek would more than double in size from approximately 2 acres under the Project to approximately 5 acres under Alternative 3. Given the increase in open space proposed under this alternative, Alternative 3 would require approximately 100,000 cy more fill material than the Project. Even though the Alternative would not require construction of the transfer pipeline, placement of a considerable amount of additional clean fill to fill Almaden Lake would require a longer construction period than the Project, and construction-related impacts would be proportionately increased.

Description of Alternative 3

Alamitos Creek Restoration

Similar to Alternative 2, under Alternative 3, Alamitos Creek would be restored in an approximately 100-foot wide by 1,600-foot long riparian corridor. The approximately 5-acre creek channel would be separated from Almaden Lake, and sized to convey a 100-year flood event. Like Alternative 2, Alternative 3 would have a narrower channel than the 210 to 420-foot wide flood channel and 11-acre creek area of the Project. The geomorphic design of the creek channel would include a riffle-pool-run pattern similar to the channel immediately upstream of the Project area. The restored creek channel would be bordered by banks on its east and west banks (as compared to a levee on just the east bank under the Project), and the eastern bank would be approximately 20-feet wide with a maintenance road and public trail along the top. A sediment catchment area at the upstream end of the creek, where sediment would be allowed to deposit, would slow the stream flow and promote sediment deposition.

Similar to the Project, this alternative would install ~~two~~ creek access ramps intended for use only by the District's operation and maintenance staff. Native riparian vegetation would be planted along both sides of the restored creek corridor providing shading and lower water temperatures for cold water fish. Native plantings would be consistent with the District's Water Resources Protection Manual (SCVWD, 2006).



SOURCE: SCVWD, 2012

Almaden Lake Improvement Project . 130679

Figure 4-2

Alternative 3: Creek with East and West Open Spaces

New Park/Open Space

Alternative 3 would create a 5-acre park/open space area west of Alamitos Creek, and a 22-acre park/open space east of the creek. The new park areas would be created by filling the lake with clean fill material to blend with the existing ground elevations of the island and surrounding Park areas. The existing vegetation on the island would remain, and the new open space areas would be planted to match the surrounding Park landscape. The lake feature, and water-based recreation activities such as pedal boating would be eliminated from the Park (SCVWD, 2013a).

The restored creek, creek banks, maintenance road, and open spaces would remain under the jurisdiction of the District. The District would consider dedicating the new open spaces to the City for incorporation with the surrounding Park area currently owned and managed by the City. In such case, the City would be responsible for any recreational improvements and uses associated with the new open spaces.

Alternative 3 Construction

Construction activities would be greater than those anticipated by the Project due to the increased amount of clean fill required to fill Almaden Lake and create approximately 27 aces of new park/open space under this alternative. Converting the entirety of Almaden Lake from open water to park/open space (with the exception of the 5-acre restored creek corridor) would require importing and depositing approximately 100,000 cy of additional fill material than the Project, and as a result the duration and magnitude of construction activity and associated construction-related environmental impacts under this option would be greater.

Similar to the Project, flow from the creek would be diverted around the construction area using a cofferdam and pumps, and the lake bed would be dewatered using portable diesel or electric pumps. A series of sheet piles would be installed along the alignments of the banks on either side of Alamitos Creek. Bank construction may require additional dewatering of shallow lake sediments using sump pumps, well points, etc.

Upon dewatering of Almaden Lake, the areas to the west and east of the restored creek would be filled with clean fill material to the existing Park and island ground elevation. The existing vegetation on the island would remain and the new open space areas would be planted similar to the surrounding Park landscape.

Ability to Meet Project Objectives

Alternative 3 would partially meet the project objectives, which are to separate Alamitos Creek from Almaden Lake; remove potential lake entrainment of anadromous fish; improve temperature conditions and reduce predation for native fish; and minimize impacts to existing recreational features. Alternative 3 would accomplish these project objectives by separating the creek from the lake, and filling in the lake and replacing it with open space.

By removing the lake, Alternative 3 would also eliminate the fish and water in the lake and would not meet the project objectives to reduce production of methylmercury, and mercury in

target fish in Almaden Lake to meet applicable water quality objectives. Because Alternative 3 would eliminate the open water area of Almaden Lake, including the area available for pedal boating, this option would not minimize impacts to existing recreational features. By creating additional new park/open space, this alternative would support continued recreational use of Almaden Lake Park, however, with the absence of the lake, the recreational experience at Almaden Lake Park would be modified.

Alternative 3 would partially meet the project purpose to restore Alamitos Creek's stream function within the footprint of Almaden Lake to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint. While water quality within the creek would be improved, water quality would not be improved within the lake (as noted above), Because of the elimination of Almaden Lake, Alternative 3 would not minimize impacts to recreational features within the Park, such as pedal boating. Other recreational opportunities would continue to be available in the Park; however, because this alternative would eliminate Almaden Lake, continued recreation use of Almaden Lake Park would be adversely affected under Alternative 3 as compared to the Project.

Environmental Impacts of Alternative 3

Under Alternative 3 ~~would eliminate the less than significant with mitigation operational noise effect of the Project by removing the need for a pump station to pump lake water to Los Alamitos Percolation Pond/Los Capitancillos Percolation Ponds. Instead~~, Almaden Lake would be filled, creating two new park/open space areas on either side of the restored Alamitos Creek channel. In creating the new park/open space, this alternative would fill approximately 27 acres of Almaden Lake, which is considered potentially jurisdictional waters of the U.S. resulting in a substantial reduction in potential wetlands at the site.

This alternative would require the placement of approximately 100,000 cy additional fill material than the Project, and as a result Alternative 3 would increase the construction-related impacts related to fill transport and deposition. The mitigation measures described for the project would also be applicable to Alternative 3.

The vista of the lake from the Park, which is the main visual element in the fore and middle ground, would be diminished compared to existing conditions, as under the Project (Impact 3-A.3). However, because the construction period would be longer than under the project, it would take longer for site to be restored after restoration plantings than under the Project. As under the Project, there is no feasible mitigation to reduce or avoid construction phase effects on the visual character of the Project site. Construction-related activities including operation of construction equipment, worker trips, and hauling trips would be increased, resulting in increased criteria air pollutant emissions, including NOx, as compared to the Project (Impacts 3.C-1 and 3.C-2). Similarly, average construction emissions would be increased as a result of more diesel-powered construction activity under Alternative 3 compared to the Project resulting in higher exposure of maximally exposed individual receptors to toxic air contaminants and a related increase in health risks (Impact 3.C-3).The length of the construction period would also increase somewhat, resulting in sensitive noise receptors and sensitive biological resources being exposed to construction activity for a longer duration.

Construction activities such as earthwork, fugitive dust, noise, vibrations, visual disturbance, and human activity would be increased under this alternative due to a somewhat longer construction period. As a result, Alternative 3 would be more disruptive to special-status birds, nesting migratory birds and raptors, and bats than the Project. Converting Almaden Lake to open space would also remove lacustrine habitat for special-status birds, such as the double-crested cormorant, herons, and egrets. In addition, the lake provides habitat for the California red-legged and foothill yellow-legged frog, and western pond turtle. Removal of lake habitat would adversely affect these species, and would reduce the occurrence of riparian communities (Impacts 3.D-1, 3.D-2, and 3.D-3). However, there would be no ground disturbance activities associated with pipeline construction under this alternative, eliminating short-term disruptions of habitat and removal/damage of street trees and trees within the park and trails along the Project's pipeline corridor (Impact 3.D-6).

Regarding special-status fish species and fish passage, this alternative would undertake similar habitat restoration activities as the Project that would require dewatering of habitat, fish relocation, and subsequent reconstruction of the creek channel with the potential to result in significant impacts on native fish species (Impacts 3.E-1). Similar to the Project, however, overall post-Project conditions should provide substantial benefit to native fish species through the restoration of the creek system to a more natural state. Nevertheless, this alternative would provide lower quality creek habitat for special-status fish species than the Project. Alternative 3 would provide only one-half of the area for the restoration of Alamitos Creek (5 acres, as compared to ~~11~~ 10 acres under the Project). This alternative would convey 100-year flood flows in a narrower and more steeply sloped creek channel (100 feet wide, as compared to the 210 to 420-foot wide flood channel of the Project). The narrower confines of the creek channel would provide less opportunity for Alamitos Creek to naturally meander in the corridor, and would restrict the creek's ability to create the complex and diverse ripple, pool, run riparian habitat beneficial to anadromous fish as compared to the Project. Also, routine sediment removal activities in the vicinity of the in-creek sediment catchment area could be detrimental to anadromous fish habitat.

Alternative 3 would have less potential for inadvertent discovery of archaeological resources, human remains, and tribal cultural resources during ground disturbing activities as the Project (Impact 3.F-1), because the lake would be filled and would not involve the ground disturbance associated with the installation of a clay cap. In addition, Alternative 3 would not require ground disturbance related to the construction of the transfer pipelines proposed under the Project.

Regarding consumption of energy resources, Alternative 3 would require a require a somewhat longer construction period than the Project resulting in greater potential for construction activities to result in wasteful or inefficient use of energy resources, as compared to the Project (Impact 3.G-1).

Similar to the Project, Alternative 3 would improve water quality in Alamitos Creek. Alternative 3 would remove Almaden Lake, so lake water quality would not be improved. Like the Project, construction activities under this alternative would cause disturbance of

sediments, release of water with elevated mercury levels, and use of construction machinery that releases hydrocarbons and other potential water quality pollutants during dewatering. Alternative 3 construction would require approximately 100,000 cy more fill than the Project, resulting in increased use of construction equipment emitting hydrocarbons and other potential pollutants. Because Alternative 3 would have a somewhat longer construction period, heavy construction equipment would be operating in the Project area for a longer period, and the potential for accidental release of water quality pollutants into the environment would increase (Impact 3.K-1).

Regarding stormwater flows, Alternative 3 would have a narrower creek channel in which to temporarily convey stormwater flows than the Project. In the event of a major storm event during construction, the narrower creek channel under this alternative would have an increased potential for the creek conveyance to be of insufficient capacity to pass stormwater flows downstream, which could result in accidental release of flows into the adjacent open space work areas, creating increased potential hazards to Project workers and construction equipment (Impact 3.K-3).

With respect to noise impacts, ~~Alternative 3 would convert Almaden Lake to open space, and would not require a pump station to convey lake water. Operation of this alternative would not involve the use of pumps resulting in the elimination of the operational noise impact that would occur under the Project (Impact 3.L-1). However, it is noted that~~ should new park areas be activated for uses such as play fields by the City, operational noise activities could be increased over existing conditions at time when playfields are in use.

Similar construction equipment would be used for this alternative as for the Project. Alternative 3 would require more fill material than the Project, resulting in a somewhat longer construction period. With a longer construction period, there would be an increase in construction equipment / traffic that could exceed the noise limits of the City's General Plan and exceed applicable threshold criteria associated with off-site construction traffic as compared to the Project resulting in an increased construction-related noise impact on sensitive receptors (Impact 3.L-1).

Alternative 3 would remove the lake from Almaden Lake Park, a central visual element for visitors to the Park. Views of the lake are available from Almaden Expressway, a county-designated scenic corridor. However, as described in Section 3.A, Aesthetics, views of the lake from Almaden Expressway would be partially screened by intervening trees and vegetation, and would be brief in duration due to traffic speeds on the expressway. Nonetheless, views of Almaden Lake Park would be dramatically altered under Alternative 3 with the replacement of the lake with new park/open space, as compared to the Project.

Under Alternative 3, water-based recreation opportunities, such as pedal boating, would no longer be available at the Park due to the replacement of the lake with new park/open space. Discontinuing pedal boating at Almaden Lake Park could result in the loss of a recreational opportunity that would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or

be accelerated. There are limited opportunities for pedal boating in the San José area. Lake Cunningham Park in San José has recently closed the lake to water activities, including pedal boating, due to water quality concerns. Vasona Park in Los Gatos, California, offers pedal boating on Vasona Lake. Removal of Almaden Lake and loss of opportunities for pedal boating could result in substantial physical deterioration of pedal boating facilities in the region (such as at Vasona Lake) due to reduction of supply, as compared to the Project.

Alternative 3 would not meet two of the project objectives. This option also would increase certain impacts and introduce new concerns, such as the filling of potentially jurisdictional waters of the U.S., the creation of lower quality creek habitat than the Project, and the loss of a lake feature and water-based recreation at Almaden Lake Park.

In summary, Alternative 3 would restore Alamitos Creek and replace the lake on either side of the creek channel with new park/open space. This alternative would remove the lake feature from Almaden Lake Park. ~~The intent of Alternative 3 would be to eliminate the less than significant with mitigation operational noise impact associated with the pump station (to pump lake water to Los Alamitos Percolation Pond/Los Capitancillos Percolation Ponds) proposed under the Project.~~ In this alternative, the Alamitos Creek restoration area would be reduced to a five-acre area (as compared to ~~11~~ 10 acres under the Project). The narrower creek corridor (100 feet wide, as compared to 210 to 420-feet wide) under this alternative would require a deeper, less complex creek system to convey 100-year flood flows and more artificial hardscape features to control erosion, resulting in lower quality creek habitat for anadromous fish than the Project.

Filling Almaden Lake under Alternative 3 would require placement of approximately 100,000 cy more fill material than would be required under the Project, resulting in a somewhat longer construction period. The extended construction period under this alternative would result in increased construction-related impacts to aesthetic resources, air quality, biological resources, energy resources, hydrology and water quality, and noise-related impacts. However, there would be no ground disturbance associated with pipeline construction under this alternative, eliminating the potential for habitat disturbance or accidental discovery of archeological resources in these pipeline corridors. All of the significant construction-related impacts of the Project would remain significant under this alternative. However, the magnitude of the significance would be somewhat increased, but the impacts would likely be reduced to a less than significant level with implementation of the same mitigation measures specified in this EIR for the Project, with the exception of aesthetic resources which would remain significant and unavoidable. The removal of the lake and the discontinuation of pedal boating at Almaden Lake Park would introduce adverse aesthetics and recreation impacts not associated with the Project.

4.C Comparison of Alternatives

The State CEQA Guidelines Section 15126.6(e) requires the identification of an environmentally superior alternative to the proposed project. If it is determined that the “no project” alternative would be the environmentally superior alternative, then the EIR shall also

identify an environmentally superior alternative among the other project alternatives (Section 15126.6[e][2]). To determine the environmentally superior alternative, the impacts of all the alternatives were compared to determine which alternative would have the least adverse effects.

Alternative 1 would eliminate the short-term construction effects relative to the Project. However, under Alternative 1 the existing water quality issues would continue, including mercury contamination (which is in exceedance of RWQCB water quality standards), low dissolved oxygen, coliform bacteria, and algal blooms. Numeric targets for fish tissue mercury concentrations would continue to be in exceedance of mercury thresholds. Also, existing non-physical barriers to anadromous fish migration would continue. Alternative 1 would not meet any of the project objectives.

Alternative 2 would reduce the short-term construction effects relative to the Project by utilizing approximately 70,000 cubic yards less fill material, resulting in an approximately 4-month shorter construction period than the Project. Construction-related activities including operation of construction equipment, worker trips, and hauling trips would be reduced, resulting in reduced criteria air pollutant emissions and exposure of sensitive receptors to toxic air contaminants, compared to the Project. Construction activities such as earthwork, fugitive dust, noise, vibrations, visual disturbance, and human activity would be somewhat lessened under this alternative due to a shorter construction period, which would be somewhat less disruptive to special-status birds, nesting migratory birds and raptors, and bats than the Project. The shorter construction period would also result in less potential for construction activities to result in wasteful or inefficient use of energy resources, reduced duration of heavy construction equipment operating in the Project area with the potential for accidental release of water quality pollutants, and reduced construction noise.

Alternative 2 would require two pump stations to convey water to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds; however, the two pump stations would have a smaller capacity than the pump station proposed under the Project due to the reduced pumping requirements of the two lakes under Alternative 2. As a result, the noise generated by the two pump stations under Alternative 2 would be similar to the operational noise of the Project's pump station. On balance, Alternative 2 would reduce the construction-related impacts of the Project, and would meet all project objectives.

Alternative 3 would ~~eliminate the operational noise impact of the pump station under the Project, but in~~ convert~~ing~~ the lake to park land, would require approximately 100,000 cubic yards more fill material than the Project, which would require a longer construction period than the Project, and construction-related impacts would be proportionately increased. The extended construction period under this alternative would result in increased construction-related impacts to aesthetic resources, air quality, biological resources, energy resources, hydrology and water quality, and noise-related impacts. Alternative 3 would increase the construction-related impacts of the Project, and would only partially meet project objectives. In addition, Alternative 3 would require a lengthier planning period than the Project, in order to meet the regulatory and permitting requirements associated with filling Almaden Lake.

As described above, the No Project Alternative (Alternative 1) and Creek with East and West Lakes (Alternative 2) would both reduce construction effects relative to the Project because: (1) there would be no facilities constructed under the No Project Alternative, and (2) Alternative 2 construction would be somewhat reduced. The significant impacts of the Project would remain significant under Alternative 2. Construction phase aesthetic resources, air emissions, special-status species impacts, energy consumption, water quality impacts, and noise impacts would be somewhat less than under the Project, and would be reduced to a less than significant level with the implementation of mitigation measures specified in this EIR for the Project. All other significant construction impacts ~~and the operational noise impact of the Project~~ would remain significant under Alternative 2, and would be reduced to a less than significant level with implementation of mitigation measures specified in the EIR for the Project, with the exception of aesthetic resources impacts which would remain significant and unavoidable, similar to the Project.

Based on the evaluation above, Alternative 2 is the environmentally superior alternative among the Project alternatives (other than the No Project Alternative). Alternative 2 would decrease the short-term, construction-related impacts as compared to the Project, resulting in reduced construction-related impacts to aesthetic resources, air quality, biological resources, energy resources, hydrology and water quality, and noise-related impacts. ~~While~~ Alternative 3 would ~~eliminate the operational noise impact of the pump station under the Project, this alternative~~ increase~~d~~ the short-term, construction-related impacts as compared to the Project, and introduced new regulatory issues associated with filling Almaden Lake. As a result, Alternative 2 would have reduced construction-related impacts as compared to the Project and Alternative 3, ~~and similar operational noise impacts as the Project,~~ and on balance would be the environmentally superior alternative.

4.D Alternatives Considered but Rejected from Further Analysis

The planning process for the Almaden Lake Improvement Project began in 2011. Over the course of the planning effort, the District considered numerous options for the Project in the context of the project objectives, technical feasibility, agency comment, public input, and constraints on implementation. Below, 11 alternatives are considered but rejected from further consideration. The first 5 alternatives provide water source options for water management in Almaden Lake in lieu of Almaden Valley Pipeline, including Alamitos Creek (Option 1), Recycled Water from the San José Water Company's Recycled Water Pipeline (Option 2), groundwater (Option 3), Los Capitancillos Recharge Ponds (Option 4), and Alamitos Canal (Option 5). The next 2 alternatives examine variations on lake and open space themes, including Creek with West Lake and East Open Space (Option 6) and Creek with West Wetland and East Lake (Option 7). In response to agency comments, the District developed the Expanded Creek Restoration alternative (Option 8). The public developed two alternatives, including East Creek with Large West Lake (Option 9) and Creek in Underground Culvert (Option 10). Finally, the District considered a technology-only option to address the lake's water quality issues: Additional SolarBees (Option 11). The reasons for considering but rejecting these alternatives from further analysis are described below.

TABLE 4-3
ALTERNATIVES CONSIDERED BUT REJECTED FROM FURTHER CONSIDERATION

Potential Alternative Identified	Description	Ability to Meet Project Objectives and Constraints on Implementation
Option 1. Alamitos Creek Water Source	• Restore Alamitos Creek alignment along western edge of lake • Separate lake from creek, and re-contour and cap lake bed • Alamitos Creek water source to fill and maintain Almaden Lake • Place screened diversion structure in creek, which requires regular sediment removal activities around intake structure • Lake flow-through system discharges back to Alamitos Creek • New point of rediversion established for the District's existing upstream water rights	• Partially Meets Project Objectives: - Separate creek from lake - Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives - Remove potential lake entrainment of anadromous fish - Minimize impacts to existing recreational features • Reasons for Rejection: - Does not meet project objectives - Does not reduce significant impacts - Use of creek water reintroduces mercury to the lake - Regular maintenance of in-creek water diversion structure could be detrimental to anadromous fish habitat - Would require approval of a water right change petition by the State Water Resources Control Board to establish new rediversion point of creek into lake
Option 2. Recycled Water Source	• Restore Alamitos Creek alignment along western edge of lake • Separate lake from creek, and re-contour and cap lake bed • Recycled water source to fill and maintain Almaden Lake • Closed lake system	• Partially Meets Project Objectives: - Separate creek from lake - Remove potential lake entrainment of anadromous fish - Improve temperature conditions and reduce predation for native fish; - Minimize impacts to existing recreational features • Reasons for Rejection: - Does not meet Project objectives - Poor water quality in lake (source water and closed lake system) - Recycled water source not available until approximately 2021
Option 3. Groundwater Source	• Restore Alamitos Creek alignment along western edge of lake • Separate lake from creek, and re-contour and cap lake bed • Pumped groundwater source to fill and maintain Almaden Lake • Lake flow-through system discharges to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds via new pipeline to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds	• Meets All Project Objectives: - Separate creek from lake - Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives - Remove potential lake entrainment of anadromous fish - improve temperature conditions and reduce predation for native fish; - Minimize impacts to existing recreational features • Reasons for Rejection: - Does not reduce significant impacts - Potential impacts to groundwater levels and other well users - Displacement of local surface water at ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds groundwater recharge basin - High annual groundwater pumping expenses - Groundwater pump would introduce new noise source - Use of groundwater would temporarily halt if the District calls on the community to conserve water

TABLE 4-3 (CONTINUED)
ALTERNATIVES CONSIDERED BUT REJECTED FROM FURTHER CONSIDERATION

Potential Alternative Identified	Description	Ability to Meet Project Objectives and Constraints on Implementation
Option 4. Los Capitancillos Recharge Water Source	• Restore Alamitos Creek alignment along western edge of lake • Separate lake from creek, and re-contour and cap lake bed • Pump Los Capitancillos Recharge Pond water supplemented by Almaden Valley Pipeline imported water to fill and maintain Almaden Lake • Lake flow-through system discharges to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds via new pipeline to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds	• Meets All Project Objectives: - Separate creek from lake - Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives - Remove potential lake entrainment of anadromous fish - Improve temperature conditions and reduce predation for native fish; - Minimize impacts to existing recreational features • Reasons for Rejection: - Does not reduce significant impacts - Requires pumping water from Los Capitancillos to the lake - Use of Guadalupe Creek water reintroduces mercury to the lake - Requires improvements to ensure adequate capacity at Los Capitancillos Ponds, and improving pipelines between ponds in the Los Capitancillos system
Option 5. Alamitos Canal Water Source	• Restore Alamitos Creek alignment along western edge of lake • Separate lake from creek, and re-contour and cap lake bed • Convey water from the east-adjacent Coyote Creek Watershed to Almaden Lake via the Alamitos Canal • Lake flow-through system discharges to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds via new pipeline to ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds	• Meets All Project Objectives: - Separate creek from lake - Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives - Remove potential lake entrainment of anadromous fish - Improve temperature conditions and reduce predation for native fish; - Minimize impacts to existing recreational features • Reasons for Rejection: - Does not reduce significant impacts - Feasibility of rehabilitating and operating the Alamitos Canal - Alamitos Canal could convey higher-than-planned flows into Almaden Lake, and sediment-laden runoff water into the lake - Would require approval of a water right change petition by the State Water Resources Control Board to establish new point of rediversion from Coyote Creek Watershed to Almaden Lake
Option 6. Creek with West Lake and East Open Space	• Restore Alamitos Creek alignment, separating the creek from the lake • Single 5-acre West Lake with re-contoured and capped lake bed • New 22-acre park/open space created by filling east lake area • Alamitos Creek water source to fill and maintain West Lake • Place screened inlet and outlet pipes and a sediment catchment area in creek, requiring regular sediment removal activities • Requires use of Alamitos flashboard dam	• Partially Meets Project Objectives: - Separate creek from lake - Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives - Remove potential lake entrainment of anadromous fish • Reasons for Rejection: - Does not reduce significant impacts - Large volume of fill required - Use of creek water reintroduces mercury to the lake - Regular maintenance of in-creek inlet and outlet pipes and sediment catchment area could be detrimental to anadromous fish habitat

TABLE 4-3 (CONTINUED)
ALTERNATIVES CONSIDERED BUT REJECTED FROM FURTHER CONSIDERATION

Potential Alternative Identified	Description	Ability to Meet Project Objectives and Constraints on Implementation
Option 6 (cont.)	• New point of rediversion established for the District's existing upstream water rights • Relocate pedal boat facility to western bank of West Lake	- Narrower and less complex and diverse creek habitat restoration than Project - Would require approval of a water right change petition by the State Water Resources Control Board to establish new rediversion point of creek into lake - Lake size reduced for boating - Public opposition to reduced presence of lake feature at the Park
Option 7. Creek with West Wetland and East Lake	• Restore Alamitos Creek alignment, separating the creek from the lake • New 5-acre wetland area west of creek • 22-acre East Lake with re-contoured and capped lake bed • Alamitos Creek water source to fill and maintain East Lake and replenish wetland • Place screened inlet and outlet pipes and a sediment catchment area in creek, requiring regular sediment removal activities • Requires use of Alamitos flashboard dam • New point of rediversion established for the District's existing upstream water rights • Relocate pedal boat facility to eastern bank of East Lake	• Partially Meets Project Objectives: - Separate creek from lake - Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives - Remove potential lake entrainment of anadromous fish - Minimize impacts to existing recreational features • Reasons for Rejection: - Does not reduce significant impacts - Use of creek water reintroduces mercury to the lake - Regular maintenance of in-creek inlet and outlet pipes and sediment catchment area could be detrimental to anadromous fish habitat - Narrower and less complex and diverse creek habitat restoration than Project - Would require approval of a water right change petition by the State Water Resources Control Board to establish new rediversion point of creek into lake - Public Concerns regarding potential odors and mosquito nuisance associated with wetland
Option 8. Expanded Creek Restoration	• Incorporate all elements of the Project • Expand restoration to 1,700-foot segment of Alamitos Creek downstream to the Alamitos Diversion Dam • Replace Alamitos Diversion Dam with an alternative water diversion system (pumping plant and fish screen)	• Meets All Project Objectives - Separate creek from lake - Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives - Remove potential lake entrainment of anadromous fish - Improve temperature conditions and reduce predation for native fish; - Minimize impacts to existing recreational features • Reasons for Rejection - Does not reduce any of the significant environmental impacts of the Project - ~~Beyond the scope and budget provided by the District's Board~~ Economically infeasible because prohibitively expensive and substantially beyond the estimated budget for the Project - Downstream loss of potentially jurisdictional waters of the U.S. - Uncertainty about feasibility of alternate water diversion system

TABLE 4-3 (CONTINUED)
ALTERNATIVES CONSIDERED BUT REJECTED FROM FURTHER CONSIDERATION

Potential Alternative Identified	Description	Ability to Meet Project Objectives and Constraints on Implementation
Option 9. East Creek with Large West Lake	• Restored Alamitos Creek alignment roughly following eastern edge of lake • Separate creek from lake with a berm on west side of creek featuring the same cross-section as the levee under the Project • Single lake to the west at existing beach • Option proposed by public	• Partially Meets Project Objectives: - Separate creek from lake - Remove potential lake entrainment of anadromous fish - Improve temperature conditions and reduce predation for native fish; - Minimize impacts to existing recreational features • Reasons for Rejection: - Technically infeasible. Constrained by physical conditions, primarily existing site elevation changes – the restored creek would be too flat to properly convey flows
Option 10. Creek in Underground Culvert	• Install culvert beneath the Almaden Lake to separate and convey Alamitos Creek past the lake • Remove existing mercury from the lake bed • Culvert pipe size to carry 100-year storm flow would be 30 to 40 feet in diameter • Option proposed by public	• Partially Meets Project Objectives: - Separate creek from lake - Improve temperature conditions and reduce predation for native fish; - Minimize impacts to existing recreational features • Reasons for Rejection: - Would not meet most project objectives - Culverting creek would provide poor aquatic habitat, and barrier to anadromous fish passage - Technically infeasible due to size of culvert required
Option 11. Additional SolarBees	• Install additional SolarBee water circulators to increase oxygenation of lake	• Does Not Meet Most Project Objectives: - Minimize impacts to existing recreational features • Reasons for Rejection: - Would not meet most project objectives

4.D.1 Option 1. Alamitos Creek Water Source

Option 1 would restore the Alamitos Creek alignment along the western edge of the lake. Similar to the Project, this option would separate the lake from creek, and re-contour and cap the lake bed to address the lake's mercury-related water quality issues. Option 1 would create a lake area east of the creek, and a new park area west of the creek, similar to the Project. Under Option 1, Alamitos Creek[3] would supply water to fill and maintain Almaden Lake. This would involve installing a screened diversion structure in the eastern bank of the creek to divert flows into the lake. Regular sediment removal activities around the intake structure would be required. The diversion structure would be gravity fed, and would connect to a buried pipe that would extend through the levee to the southwestern side of the lake. A concrete outlet structure or rock riprap would be constructed at the pipe outlet to protect the lake bank from erosion.

[3] A new water right would need to be obtained to divert creek water into the lake.

Option 1 would discharge lake water back into Alamitos Creek to circulate water through the lake to maintain water quality. Lake water would be pumped out of the lake through a pipe installed in the levee and into the creek. A pump station would be constructed on the lake side of the new levee, and would contain a fish screen to prevent non-native fish from entering Alamitos Creek.

Option 1 would partially meet project objectives to separate Alamitos Creek from Almaden Lake; reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives by capping the lake bottom and circulating creek water in the lake (although creek water would reintroduce some mercury into the lake); remove potential lake entrainment of anadromous fish by separating the creek and lake; and minimize impacts to existing recreational features. Because lake water would be discharged back into Alamitos Creek, Option 1 would not meet the project objective to improve temperature conditions and reduce predation for native fish.

A new water right would need to be obtained to divert creek water into the lake, which would require the approval of a water right change petition by the State Water Resources Control Board, and could take between two to five years to approve if the water right amendment is contested (SCVWD, 2018).

Option 1 would introduce new issues associated with the use of water from Alamitos Creek. Mercury-laden sediment in the creek originating from the historic mines would be reintroduced to Almaden Lake, potentially compromising lake water quality. In addition, this option would require regular maintenance of the in-creek water diversion structure to keep the diversion clear of blockage and debris. Alamitos Creek is known to carry large amounts of gravels, which could require frequent (potentially annual) maintenance of the diversion structure. Frequent disturbance of the creek channel could be detrimental to anadromous fish habitat in this portion of the creek, and would require obtaining appropriate permits from regulatory agencies. ~~Relying on a gravity-fed water conveyance between the lake and the creek, Option 1 would eliminate the less than significant with mitigation operational noise impact associated with the Project's operation of a pump station to pump water from the lake., However, s~~ Since Option 1 does not reduce most significant effects of the Project, and introduces new issues with respect to reintroducing mercury into the lake and requiring increased routine in-creek maintenance activities, this option was considered but rejected from further analysis.

4.D.2 Option 2. Recycled Water Source

The San José Water Company Recycled Water Master Plan proposes a new recycled water distribution pipeline, which would provide 4,060 gallons per minute (gpm) of tertiary-treated water to the Bolder Ridge Golf Course located on Winfield Boulevard. Option 2 would use this recycled water as the rehabilitated lake's water source. Similar to the Project, Option 2 would separate the lake from creek, and re-contour and cap the lake bed to address the lake's mercury-related water quality issues. This option would create a lake area east of the creek, and a new park area west of the creek, similar to the Project. However, Option 2

would connect with the San José Water Company's Recycled Water Pipeline in Winfield Boulevard approximately 200 feet from Almaden Lake. Recycled water would be discharged into the lake along its eastern shore, and would support limited recirculation of the lake's water supply. A flow-through system would not be feasible for recycled water. Santa Clara Valley Water District Policy prohibits the use of recycled water for groundwater recharge, and release of recycled water to a creek is not supported by State policy. Instead, Option 2 would maintain the lake as a closed system (SCVWD, 2018).

Recycled water from the lake would be used in the Park's toilets, urinals, and for landscape irrigation. During normal operations, water would be supplied to the lake when the lake's water level falls below its capacity. The amount of water required under normal operations would be dependent on the amount of water withdrawn for the Park's toilets, urinals, and landscape irrigation. Water for this purpose would be withdrawn from the lake via an intake structure, which would be screened to prevent entry of fish and debris. Water would be pumped from the lake for nonpotable uses via a pump station. Signs would be installed throughout the Park noting the use of recycled water, and warning Park users that the water is non-potable. Under this option, water contact would not be permitted (with the exception of pedal boating). After use, this water would be discharged to the municipal sewer system.

Option 2 would partially meet the project objectives. This option would meet the project objectives to separate Alamitos Creek from Almaden Lake; remove potential lake entrainment of anadromous fish; improve temperature conditions and reduce predation for native fish; and minimize impacts to existing recreational features. Option 2 would only partially meet the project objective of reducing production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives. Although the lake would be drained, re-contoured, and capped to contain mercury contamination, the source water would introduce new water quality issues. Recycled water has high concentrations of nutrients, and because of its poor water quality, there would be limited opportunities to circulate water into and out of the lake. Recycled water could not be released into the creek, and could not be used for groundwater recharge at the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds. With the addition of nutrient-laden recycled water to the lake, the ongoing release of fecal matter into the lake from waterbirds, and the need to maintain the lake as a largely closed system, it would be a challenge to meet applicable water quality objectives (SCVWD, 2018).

~~In addition, construction of the recycled water pipeline along Winfield Boulevard is projected to be completed in 2021 (SCVWD, 2018). As such, recycled water would not be available as a water source until the San José Water Company's Recycled Water Pipeline in Winfield Boulevard is complete. Under this option, the availability of recycled water could delay planning and construction of the Almaden Lake Improvement Project.~~

Option 2 was considered but rejected from further analysis. ~~This option would rely upon recycled water as source water for the lake. The recycled water would not be available until 2021, which could delay planning and construction of the Almaden Lake Improvement Project. In addition,~~ Option 2 would introduce new water quality issues with the use of

recycled water, counter to the project objective to reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives. Recycled water has high concentrations of nutrients. Because of recycled water's poor water quality, the lake system would need to operate as a largely closed system with limited opportunities to circulate water into and out of the lake. Under this option, it would be a challenge for the Santa Clara Valley Water District to meet applicable water quality objectives in the lake with the combination of nutrient-laden recycled water and limited opportunities for lake water circulation.

4.D.3 Option 3. Groundwater Source

Option 3 would pump 4,350 AFY of groundwater to fill and maintain Almaden Lake after restoration of Alamitos Creek. Similar to the Project, this option would separate the lake from creek, and re-contour and cap the lake bed to address the lake's mercury-related water quality issues. Option 3 would create a lake area east of the creek, and a new park area west of the creek, similar to the Project. In order to fill and maintain Almaden Lake, groundwater would be pumped from a new, deep well located adjacent to the lake. Pumped groundwater would be piped into the lake. This option would have a flow-through water management system similar to the Project to maintain lake water levels and water quality, in which water would be pumped out of the lake via a pump station and piped to the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds for groundwater recharge.

This option would meet all of the project objectives, which are to separate Alamitos Creek from Almaden Lake; reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives; remove potential lake entrainment of anadromous fish; improve temperature conditions and reduce predation for native fish; and minimize impacts to existing recreational features.

Although Option 3 would meet all of the project objectives, this option would not reduce any of the significant effects of the Project. Many of the Project's components generating significant effects (e.g., diverting the creek, draining the lake, ~~generating operational noise,~~ etc.) would continue under this option in order to meet the project objectives. However, this option would introduce new concerns associated with pumping groundwater. Implementation of this option would make the District the highest groundwater extractor in Zone W2 of North County. The effects on nearby well users in the aquifer would be unknown. The feasibility of achieving the pumping capacity required under this option also would be unknown. Additional geotechnical exploration and pump tests would need to be undertaken. The daily pumping of groundwater would be dependent on the depth-to-aquifer water table, and the rate at which underlying groundwater would be recharged. The reliability of this water supply would be uncertain. During drought years, it would not be possible to pump groundwater into the lake, resulting in potential declines in lake water quality during these periods (SCVWD, 2018).

Pumping large amounts of groundwater could adversely affect the underlying groundwater basin. The pumped groundwater would be moved into the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds, and should nominally result in a net zero effect on the groundwater basin (i.e., groundwater pumped out would be recharged in the percolation

pond). However, ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds has a fixed capacity, and local surface water is currently being directed to the ~~Los~~ Alamitos Percolation Pond for groundwater recharge. Groundwater pumped under this option could displace local water currently being pumped into the pond, potentially adversely affecting the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds water right (APPWR), and surface water or groundwater could be lost from the water supply system (SCVWD, 2018).

Operation of the groundwater pumping system would generate a new noise source in the area. Pumping up to 4,350 AFY of groundwater would require an industrial-capacity pump that would create a substantial new noise source~~ similar to the Project~~. This option also would be considerably more expensive than the Project. For example, purchase of Almaden Valley Pipeline water under the Project would be approximately $25,000 per year (2018 dollars). However, the expense associated with pumping a similar amount of groundwater would be approximately $5 million dollars per year (2018 dollars) (SCVWD, 2018). This increase in operational expenses would be infeasible for the District, and also would divert funds away from other important District priorities. Option 3 was considered but rejected from further analysis because it would not reduce any significant effects of the Project, and would introduce new issues associated with groundwater extraction.

4.D.4 Option 4. Los Capitancillos Recharge Water Source

Under Option 4, water for Almaden Lake would come from a combination of the Los Capitancillos Recharge Ponds and imported water from the Almaden Valley Pipeline. As with the Project, Option 4 would separate Almaden Lake from Alamitos Creek, and re-contour and cap the lake bed to address mercury-related water quality issues. This option would create a lake area east of Alamitos Creek, and a new park area west of the creek, similar to the Project. Water from the Los Capitancillos Recharge Ponds, approximately one-third of a mile northwest of Almaden Lake, would be used to fill and maintain Almaden Lake. Los Capitancillos water would need to be supplemented by imported water from the Almaden Valley Pipeline to achieve the 4,350 AFY target, as only up to 3,730 AFY would be available from the Los Capitancillos ponds and much of this water would be percolated in the ponds for groundwater recharge (SCVWD, 2018).

A pump station would be constructed to pump water from the Los Capitancillos ponds via a new pipeline approximately one-third of a mile to Almaden Lake. Improvements would be made in the Los Capitancillos pond system to ensure that the ponds would have adequate capacity to accommodate groundwater recharge in the ponds, and also transfer sufficient water to maintain Almaden Lake. The existing pipelines within the Los Capitancillos pond system would be improved to ensure sufficient water would migrate to the eastern-most Los Capitancillos Pond (closest to Almaden Lake). Option 4 would have a flow-through water management system similar to the Project to maintain Almaden Lake water levels and water quality. Almaden Lake water would be pumped out of the lake via a pump station, and piped to the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds for groundwater recharge, similar to the Project.

As described above, a combination of local and imported water would be sent from the Los Capitancillos ponds via Almaden Lake to the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds. Imported water under this option would not affect groundwater recharge in the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds, but recharge capacity could be taken by imported water (displacing local surface water) thereby reducing the amount of APPWR that could be put to beneficial use at the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds, potentially jeopardizing this water right. As a result, the District could prioritize maintaining the use of local water to maintain the APPWR by directing 3,302 AFY to the Alamitos Diversion and potentially limit the amount of source water sent to Almaden Lake (SCVWD, 2018).

Option 4 would meet all of the project objectives, which are to separate Alamitos Creek from Almaden Lake; reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives; remove potential lake entrainment of anadromous fish; improve temperature conditions and reduce predation for native fish; and minimize impacts to existing recreational features.

Although Option 4 would meet all of the project objectives, this option would not reduce any of the significant effects of the Project. The Project elements generating significant effects, such as separating Alamitos Creek from Almaden Lake, draining the lake, and re-contouring and capping the lake bed would continue under Option 4 in order to meet the project objectives. Water acquisition under this option for maintaining Almaden Lake would require more construction activity and an additional pumping station compared to the Project. Option 4 would require making improvements to the pipelines within the Los Capitancillos pond system as well as to the Los Capitancillos ponds to provide sufficient water capacity in the pond system to accommodate both groundwater recharge in the ponds and transfer of water to Almaden Lake (SCVWD, 2018). Compared to the Project, this option would also require an additional pump station at the eastern end of the Los Capitancillos Pond system to pump water from the ponds to Almaden Lake. The Los Capitancillos pump station would be a new noise source in the Project area, and would be within 500 feet of residential and commercial uses, including the La Mirador Senior Apartments housing complex located south of the Los Capitancillos ponds.

In addition, water sourced from the Los Capitancillos Ponds would originate from the upper Guadalupe River watershed, and would contain similar mercury-laden sediment found in Alamitos Creek. Using Los Capitancillos Pond water would re-introduce mercury into Almaden Lake (SCVWD, 2018). Although (similar to the Project) the Almaden Lake bed would be re-contoured to minimize the potential for methylation of mercury, Option 4 could introduce new methylmercury water quality issues to Almaden Lake as compared to the Project, which would utilize only imported Almaden Valley Pipeline water to fill and maintain Almaden Lake. Option 4 was considered but rejected from further analysis because it would not reduce the significant effects of the Project, and would involve more extensive construction efforts at the Los Capitancillos Ponds, introduce a new noise source within 500 feet of sensitive receptors, and could result in lower Almaden Lake water quality as compared to the Project.

4.D.5 Option 5. Alamitos Canal Water Source

Under Option 5, water from the east-adjacent Coyote Creek Watershed would be used to fill and maintain Almaden Lake. Coyote Creek water would be conveyed along the Alamitos Canal. The Alamitos Canal historically transferred water along the Santa Teresa Hills from Coyote Creek to Almaden Lake to be captured for groundwater recharge in the Guadalupe River and ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds. Similar to the Project, Option 5 would separate Almaden Lake from Alamitos Creek, and re-contour and cap the lake bed to address mercury-related water quality issues. Option 5 also would create a lake area east of Alamitos Creek, and a new park area west of the creek, as in the Project. Water from the Coyote Creek Watershed would be conveyed via the Alamitos Canal to fill and maintain Almaden Lake. The Alamitos Canal structure is in disrepair, and would need to be rehabilitated in order to be utilized for this purpose. In addition, either a segment of the Coyote Canal (which historically conveyed water into the Alamitos Canal) would similarly need to be rehabilitated, or a water diversion would need to be created in Coyote Creek to pump water into the Alamitos Canal (SCVWD, 2018). Pumping water from Coyote Creek into the Alamitos Canal would require the development of a new pump station.

Option 5 would have a flow-through water management system similar to the Project to maintain Almaden Lake water levels and water quality. Almaden Lake water would be pumped out of the lake via a pump station, and piped to the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds for groundwater recharge, similar to the Project.

This option would meet all of the project objectives, which are to separate Alamitos Creek from Almaden Lake; reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives; remove potential lake entrainment of anadromous fish; improve temperature conditions and reduce predation for native fish; and minimize impacts to existing recreational features.

Option 5 would meet all of the project objectives; however, this option would not decrease any of the significant effects of the Project. The Project elements that would primarily generate significant effects (e.g., separating Alamitos Creek from Almaden Lake, draining the lake, re-contouring and capping the lake bed, etc.) would continue to occur under Option 5 in order to meet the project objectives. However, Option 5 would affect a larger geographic area than the Project, and would extend into an adjacent watershed, creating more geographically-dispersed, construction-related impacts and also greatly increasing Project costs. Under this option, construction activity would include the rehabilitation of the Alamitos Canal, and either the rehabilitation of a portion of the Coyote Canal or the development of a Coyote Creek diversion and pump station to pump Coyote Creek water into the Alamitos Canal. A new point of rediversion would need to be established for the District's existing water rights in the Coyote Creek Watershed. This rediversion would require the approval of the State Water Resources Control Board, and could take between two to five years to get approvals if the rediversion application is protested (SCVWD, 2018).

In addition, the Alamitos Canal naturally collects stormwater runoff from the areas in the basin uphill from the canal. The canal rehabilitation efforts would be designed to reduce the

capture of local stormwater runoff from the Coyote Creek Watershed, but it would be unlikely that unintentional stormwater capture could be eliminated. As a result, winter storm events could convey unplanned stormwater runoff flows into the Alamitos Canal and subsequently into Almaden Lake. Such unplanned winter stormwater flows would require the development of a contingency plan for addressing surge stormwater events. Stormwater runoff also carry increased sediment loads, and these sediments could increase sedimentation in Almaden Lake. Option 5 also would include operations and maintenance work to maintain the Alamitos Canal and the Coyote Creek pump station.

Option 5 was considered but rejected from further analysis. This option would not reduce the significant effects of the Project, but would require more extensive construction, operation, and maintenance efforts that would extend into the adjacent Coyote Creek Watershed. This option also would require a management plan to address potential winter stormwater runoff from the Coyote Creek Watershed being conveyed to the Alamitos Canal and into Almaden Lake, along with the adverse water quality impacts associated with runoff sediment loads being deposited in Almaden Lake.

4.D.6 Option 6. Creek with West Lake and East Open Space

Option 6 would restore the Alamitos Creek alignment, and separate Almaden Lake from Alamitos Creek. The restored creek channel would be within an approximately 5-acre area, as compared to a 11-acre restored creek channel under the Project. The creek section would be about 100-feet wide (compared to 210 to 420-foot wide flood channel under the Project), and the alignment would be designed to convey 100-year flood flows. This option would create a 5-acre West Lake area, and a new 22-acre park/open space east of Alamitos Creek. The new West Lake would be re-contoured, and the bottom would be capped to address the lake's mercury-related water quality issues. SolarBees would be used to promote water circulation in the lake. The pedal boat facility would be relocated to the western bank of the new West Lake (SCVWD, 2013a).

The new park area would be created by filling the lake area east of the creek with clean fill material to blend with the existing ground elevations of the island and surrounding Park areas (SCVWD, 2013a). Converting a 22-acre area of Almaden Lake from open water to park/open space would require considerably larger volumes of fill material and as a result a longer construction period than would be required under the Project.

Under Option 6, Alamitos Creek[4] would supply water to fill and maintain the West Lake. Water for the West Lake would come from Alamitos Creek through inlet and outlet pipes installed at either ends of the lake to allow for the inflow and outflow of water between the lake and the creek. Fish screens would be installed to prevent fish from crossing between the creek and the lake. To reduce the amount of mercury-laden sediment re-entering the lake, a sediment catchment area would be located in the upstream portion of the restored creek section in order to slow creek flows and promote sediment deposition. Both the sediment catchment area and the inlet and outlet pipes would require routine maintenance

[4] A new water right would need to be obtained to divert creek water into the lake.

for sediment removal and disposal. A gravel maintenance road would be constructed along the top of the east creek bank to provide creek maintenance access. The Alamitos Flashboard Dam would be utilized between April and December, and would raise the water surface elevations by approximately 5 feet when in place (SCVWD, 2013a).

This option would meet most of the project objectives, which are to separate Alamitos Creek from Almaden Lake; reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives (although use of creek water would reintroduce some mercury into lake); and remove potential lake entrainment of anadromous fish. This option would release lake water into Alamitos Creek, and would not meet the project objective of improving temperature conditions and reducing predation for native fish. Option 6 would substantially reduce the open water area of Almaden Lake, including the area available for pedal boating. As a result, this option would not minimize impacts to existing recreational features.

~~Although Option 6 would eliminate the less than significant with mitigation operational noise impact associated with the Project's operation of a pump station, t~~ This option would fill approximately 22 acres of Almaden Lake, which are considered potentially jurisdictional waters of the U.S. resulting in a substantial reduction of potential wetlands at the site. Converting Almaden Lake to open space also would remove lacustrine habitat for special-status birds, such as the double-crested cormorant, herons, and egrets. This option would require the placement of a larger amount of fill material than the Project, and as a result Option 6 would increase the construction-related impacts related to fill transport and deposition.

The use of water from Alamitos Creek could reintroduce mercury to the West Lake, and methylmercury production could reoccur in the new lake. In addition, high deposition of sediment would be expected in the restored creek due to the high gravel loads in Alamitos Creek. Routine sediment removal activities in the vicinity of the inlet and outlet pipes and the sediment catchment area could be detrimental to anadromous fish habitat.

Option 6 also would not restore Alamitos Creek and floodplain to the same extent as the Project. This option would dedicate 5 acres to the creek channel and floodplain restoration, as compared to ~~11~~ 10 acres under the Project. The riparian corridor would be narrower (i.e., 100 feet wide, as compared to 210 to 420-feet wide under the Project). Conveying 100-year flood flows under this option would require a deeper, less complex creek channel, more artificial hardscape features to control erosion, and less riparian vegetation. The narrower channel would result in lower quality creek habitat for native fish and wildlife than the Project.

A new water right would need to be obtained to divert creek water into West Lake, which would require the approval of a water right change petition by the State Water Resources Control Board and could take between two to five years to approve if the water right amendment is contested. The area available for pedal boating would be greatly reduced, as compared to the Project. In addition, the public has expressed concerns regarding the substantially reduced presence of a lake feature at the Park.

~~Although Option 6 would eliminate the pump station-related operational noise impact of the Project, t~~This option would increase certain impacts and introduce new concerns, including filling 22 acres of potentially jurisdictional waters of the U.S. and lacustrine habitat for special-status birds, increasing construction-related impacts associated with transport and deposition of fill material, reintroducing mercury to the West Lake through the use of water from the creek possibly contributing to methylmercury production, and requiring increased routine in-creek maintenance and sediment removal activities. As a result, this option was considered but rejected from further analysis.

4.D.7 Option 7. Creek with West Wetland and East Lake

Option 7 would create a new 5-acre wetland area west of Alamitos Creek, and a 22-acre East Lake to the east of Alamitos Creek. This option would separate Alamitos Creek from Almaden Lake, and restore the creek in an approximately 5-acre riparian corridor, as compared to the 11-acre creek corridor under the Project. The creek section under Option 7 would be about 100-feet wide (compared to 210 to 420-foot wide flood channel under the Project), and the alignment would be designed to convey 100-year flood flows.

The new wetland area would be created by re-contouring and capping the lake bottom to eliminate contact between the existing mercury-laden sediment and the water in the new wetland area. The wetland would be connected to Alamitos Creek via inlet and outlet pipes installed at either end of the wetland to allow for the inflow and outflow of water between the wetland area and the creek. Fish screens at the pipe ends would prevent fish from crossing between the creek and wetland area. Aquatic plants would be sited in one to two feet of shallow water, and would consist largely of bulrush and cattail species.

Similarly, East Lake would be created by re-contouring the lake bed and capping the bottom to address the lake's mercury-related water quality issues. The existing island would remain, and would not be re-contoured to increase its bank stability. SolarBees would continue to be used to promote water circulation in the lake. The pedal boat facility would be relocated to the eastern bank of East Lake (SCVWD, 2013a).

Alamitos Creek[5] would supply water to fill and maintain East Lake through inlet and outlet pipes installed at either ends of the lake to allow for the inflow and outflow of water between the lake and the creek. Fish screens would be installed to prevent fish from crossing between the creek and the lake. To reduce the amount of mercury-laden sediment re-entering East Lake, a sediment catchment area would be located in the upstream portion of the restored creek section in order to slow creek flows and promote sediment deposition. The sediment catchment area and the inlet and outlet pipes for the wetland and the lake would require routine maintenance for sediment removal and disposal. A gravel maintenance road would be constructed along the top of the east creek bank to provide creek maintenance access. The Alamitos Flashboard Dam would be utilized between April and December, and would raise the water surface elevations by approximately 5 feet when in place (SCVWD, 2013a).

[5] A new water right would need to be obtained to divert creek water into the lake.

This option would partially meet the project objectives, which are to separate Alamitos Creek from Almaden Lake; reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives; remove potential lake entrainment of anadromous fish; and minimize impacts to existing recreational features. Option 7 would release lake water into Alamitos Creek, and would not meet the project objective of improving temperature conditions and reducing predation for native fish.

Option 7 ~~would eliminate the operational noise impact of the Project, but would introduce new environmental issues. Relying on a gravity-fed water conveyance between the creek and wetlands/lake, Option 7 would eliminate the less than significant with mitigation operational noise impact associated with the Project's operation of a pump station. However, this option~~ would generate similar construction-related impacts associated with isolating the creek channel, and re-contouring and capping the lake bottom. Option 7 would create 5 acres of new wetlands with associated benefits to biological and hydrologic resources. However, this artificially-created and maintained wetland would be of marginal quality because it would require piped creek water to maintain it. Further, the use of water from Alamitos Creek could reintroduce mercury to the wetlands and East Lake, and methylmercury production could reoccur in these waters. This option would require regular disturbance of the creek bed for routine sediment removal activities to maintain the inlet/ outlet pipes, and the sediment catchment area. As a result, the quality of the creek corridor habitat for anadromous fish and other aquatic species would be lower than under the Project due to increased regular maintenance activities in the creek channel.

This option also would not restore Alamitos Creek and floodplain to the same extent as the Project. Option 7 would dedicate 5 acres to the creek channel restoration, as compared to ~~11~~ 10 acres under the Project. The larger creek restoration area under the Project would allow for more extensive incorporation of features such as broader floodplains, proper channel meander, rock weirs/step pools, in-channel wetlands, and riparian vegetation restoration, all of which would add to habitat diversity beneficial for native fish and wildlife.

Similar to Option 6, this option would require approval of a water right change petition by the State Water Resources Control Board to divert creek water into the lake and the wetland. With respect to the new wetland, the public has expressed concerns that the wetland could develop stagnant water and become a new source of unpleasant odors as well as a breeding ground for mosquitos. Option 7 was considered but rejected from further analysis because it could potentially reintroduce methylmercury production in the East Lake and the wetland through the use of creek water; would require on-going, in-creek maintenance activities to remove sediment, diminishing the quality of anadromous fish habitat; and would not restore Alamitos Creek's stream function to the same extent as the Project.

4.D.8 Option 8. Expanded Creek Restoration

Option 8 would expand the Project area to include the area downstream of Almaden Lake (north of Coleman Road) to the Alamitos Diversion Dam, doubling the Alamitos Creek restoration area from 1,800 linear feet to approximately 3,450 linear feet. The National

Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service identified this option in the agency's comment letter on the Notice of Preparation of an Environmental Impact Report for the Almaden Lake Improvement Project (NOAA, 2014). Option 8 would incorporate all of the elements of the Project, and would extend restoration of Alamitos Creek to include the 1,700-foot stretch of Alamitos Creek between Coleman Road and the Alamitos Diversion Dam, as well as the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds. However, to implement such a project, riparian channel modifications would likely be required well downstream of the Alamitos Diversion Dam.

This option also would include replacing the Alamitos Diversion Dam with a pumping plant (and some structure to capture water) and fish screens to restore riffles, runs, and other fast-water, riverine habitat features that support native anadromous fish. Operation of the Alamitos Flashboard Dam (typically April through December) raises the water surface elevation upstream of the dam by approximately five feet, and creates deeper, slower moving water. The District operates the Alamitos Flashboard Dam as part of its public water supply mission to provide safe, clean water to its users. The rise in water elevation associated with the dam allows water to be diverted into the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds system for groundwater recharge. The District has established water rights of up to 18,700 acre-feet that can be utilized with operation of the Alamitos Flashboard Dam (SCVWD, 2011), and alteration of the agency's water rights would require the approval of a water right change petition by the State Water Resources Control Board and could take between two to five years to approve if the water right amendment is contested.

Option 8 would meet all of the project objectives, which are to separate Alamitos Creek from Almaden Lake; reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives; remove potential lake entrainment of anadromous fish; improve temperature conditions and reduce predation for native fish; and minimize impacts to existing recreational features.

The purpose of the Project is to restore Alamitos Creek's stream function within the footprint of Almaden Lake in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint. By adopting a larger Project area with a doubled length of Alamitos Creek, this option would improve more anadromous fish habitat than the Project. However, this option would expand the Project outside of the footprint of Almaden Lake. Although this option would be beneficial to native anadromous fish and its related habitat, Option 8 would be infeasible because it would be prohibitively expensive and beyond the ~~scope and the~~ budget provided by the District's Board in the 2015-2016 Capital Improvement Program (CIP).

Option 8 also would not decrease any of the significant effects of the Project. This option would include all of the elements of the Project, and would therefore include all of the significant environmental impacts of the Project. Because Option 8 would expand the Project footprint to include the area between the lake and the Alamitos Diversion Dam, this option would have more extensive construction-related impacts than would occur under the Project. In addition, the area periodically inundated by the operation of the Alamitos Flashboard Dam, including

the ~~Los~~ Alamitos Percolation Pond/Los Capitancillos Percolation Ponds, are potentially jurisdictional waters of the U.S. Ceasing the operation of the Alamitos Flashboard Dam as proposed under this option could reduce the size and extent of these potentially jurisdictional waters.

~~Option 8 was considered but rejected from further consideration. This option does not decrease any of the significant environmental effects of the Project, could result in the loss of potentially jurisdictional waters of the U.S. downstream of the Project area, and is infeasible because it expands beyond the scope and the budget for the Project provided by the District's Board.~~ In summary, Option 8 rejected from further consideration because:

- It does not reduce significant environmental effects of the Project as required for an alternative under CEQA
- It increases construction related impacts beyond those of the Project
- It could result in the loss of potentially jurisdictional waters of the U.S. downstream of the Project area
- It decreases groundwater recharge volumes in-stream behind the diversion dam in Guadalupe River, thereby reducing Valley Water water supplies
- It is considered economically infeasible because it is prohibitively expensive and substantially expands beyond the budget for the Project provided by the District's Board.

4.D.9 Option 9. East Creek with Large West Lake

Option 9 suggests relocating Alamitos Creek to the eastern side of Almaden Lake, and restoring the creek roughly following the eastern edge of Almaden Lake. The creek would be separated from the lake with a berm on the west side of the creek featuring approximately the same cross-section as the levee proposed under the Project (SCVWD, 2013b).

Almaden Lake would be a single lake to the west of the restored creek, and the lake would extend west to the existing beach. This option was developed and proposed by members of the public (SCVWD, 2013c). Similar to the Project, this option would separate the lake from creek (although this option would relocate the creek to the east, instead of maintaining it in its natural corridor). Under Option 9, the lake would be a closed system without a flow-through water management system, and this option would not address the lake's mercury-related water quality issues.

This option would partially meet the project objectives predominantly by separating the creek from the lake, including objectives to separate Alamitos Creek from Almaden Lake; remove potential lake entrainment of anadromous fish; ; improve temperature conditions and reduce predation for native fish; and minimize impacts to existing recreational features. Lake water quality would not be addressed under this option, and as a result, this option would not meet the project objective related to reducing production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives.

Although Option 9 as conceived would meet some of the project objectives, this option would not be technically feasible. The option would be constrained by the physical conditions of the Project location, predominantly the fixed existing site elevation change between the entry and exit points at the lake (SCVWD, 2013c). Rerouting Alamitos Creek outside of its natural corridor to the eastern edge of the existing lake would require substantial geoengineering efforts to achieve necessary ground elevations at the site, and would also require hardscape banks to avoid Alamitos Creek returning to its natural channel, particularly during high flow periods. Option 9 would require increased earth-moving construction work than the Project, resulting in increased construction-related impacts. In addition, the relocated creek channel would provide poor anadromous fish habitat, as compared to the Project. As a result, Option 9 was considered but rejected from further analysis because it would be technically infeasible due to physical site elevation limitations associated with relocating the creek, would not address the lake's mercury-related water quality issues, would result in increased earth-moving construction-related impacts, and would provide poor anadromous fish habitat in the creek, as compared to the Project.

4.D.10 Option 10. Creek in Underground Culvert

Under Option 10, Alamitos Creek would be separated from Almaden Lake by being placed in an underground culvert and routed under the lake. The culvert would run the length of the lake in a north-south alignment, in approximately the same location as the existing creek. This option would remove the existing mercury from the lake bed to partially address the lake's mercury-related water quality issues. This option was developed and proposed by the public (SCVWD, 2013b and 2013c). Under this option, Almaden Lake would become a closed lake system, with no circulation of water into and out of the lake.

Option 10 would not meet the purpose of the Project to restore Alamitos Creek's stream function within the footprint of Almaden Lake in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint. In particular, culverting Alamitos Creek would meet three of the project objectives: separating Alamitos Creek from Almaden Lake, improving temperature conditions and reducing predation for native fish, and minimizing impacts to existing recreational features. This option would not meet the remaining project objectives. Culverting Alamitos Creek would make this section of the creek impassible for anadromous fish, and would not fulfill the intent and purpose of the project objective to remove potential lake entrainment of anadromous fish. In addition, removing the mercury-contaminated sediment from the lake bed may not be a permanent solution to address the mercury-related water quality issues in Almaden Lake, and the related project objective to reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives would not be met.

Option 10 also would be technically infeasible. The underground culvert would need to be sized to convey 100-year storm flows. The District estimates that the Alamitos Creek culvert would need to be approximately 25 to 40-feet in diameter to be of sufficient capacity to convey 100-year flood flows (SCVWD, 2013c). Installation and maintenance of a culvert of this size would be cost prohibitive and technically infeasible for the District. Option 10 would

neither meet the majority of the project objectives, nor would it be technically feasible. As a result, this option was considered but rejected from further consideration.

4.D.11 Option 11. Additional SolarBees

Option 11 would install a total of 10 SolarBees in Almaden Lake to improve water circulation. As described in Chapter 3, Section 3.K Hydrology and Water Quality, SolarBees are solar-powered circulators designed to mix surface water with higher dissolved oxygen into lake bottom waters and vice versa, thereby increasing the oxygen content of lower water layers and reducing mercury methylation. Relying on a solar-powered circulation pump, the devices draw water through a vertical pipe, oxygenate the water via contact with the air surface, and release the water. The Project proposes to install a total of seven SolarBees, including two within the deep waters of the lake to improve overall mixing of water near the bottom and one within the shallow waters to improve circulation of water within the top of the water column. Option 11 would install an additional 3 SolarBees, and would bring the total number of SolarBees operating in Almaden Lake to 10 SolarBees.

By solely adding additional SolarBees to Almaden Lake, Option 11 would not meet the purpose of the Project to restore Alamitos Creek's stream function within the footprint of Almaden Lake in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint. Option 11 would not separate Alamitos Creek from Almaden Lake, and therefore would not remove the hazard of potential lake entrainment of anadromous fish, nor would this option improve temperature conditions and reduce predation for native fish. As discussed in Chapter 3, Section 3.K, Hydrology and Water Quality, while SolarBees were shown to provide some limited benefits to water quality, methylmercury concentrations in small and large fish have not meaningfully decreased since the introduction of SolarBees in the lake. SolarBees have not adequately addressed Almaden Lake's water quality issues, and are not considered a long-term solution (SCVWD, 2011). As a result, Option 11 would not meet the project objective to reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives. Option 11 would provide similar recreational features as would be provided under the Project and would not include any of the construction-related disruptions to recreational use of the Park, so this option would meet the project objective to minimize impacts to existing recreational features.

This option would avoid the short-term, construction-related impacts of the Project. Option 11 would not involve any of the ground-disturbing elements of the Project, such as recontouring and capping the lake bottom and creating a levee to separate Alamitos Creek from Almaden Lake. As noted above, however, this option also would not ameliorate any of the adverse impacts upon anadromous fish and water quality that the Project has been designed to improve.

Overall, Option 11 would not meet the purpose of the Project to restore Alamitos Creek's stream function within the footprint of Almaden Lake in order to improve steelhead and other anadromous fish habitat. This option would not separate the creek from the lake, remove potential lake entrainment of anadromous fish, nor would it reduce release of Almaden

Lake's warm water downstream into the Guadalupe River. Option 11 also would not reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives. As a result, Option 11 was considered but rejected from further consideration.

4.E References

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SCVWD, 2013b. "Restoring Almaden Lake: An update on addressing mercury contamination and water quality." Power Point Presentation dated September 5, 2013.

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CHAPTER 5
Cumulative Impacts

This chapter addresses the cumulative impacts of the Almaden Lake Improvement Project (Project). The purpose of this analysis is to disclose significant cumulative impacts that would result from implementation of the Project in combination with past, present, and reasonably foreseeable probable future projects in and beyond the Project area. "Cumulative impacts" refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (CEQA Guidelines §15354).

5.A CEQA Analysis Requirements

CEQA Guidelines Section 15130 requires that an Environmental Impact Report (EIR) discuss a Project's contribution to cumulative impacts. The cumulative impact analysis may be less detailed than the analysis of a given project's individual effects (CEQA Guidelines § 15130(b)). The cumulative impact from several projects is defined as:

> ….the change in the environment which results from the incremental impact of the project added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individual minor but collectively significant projects taking place over a period of time (CEQA Guidelines § 15355(b)).

Section 15130(b) requires one of the following approaches for an adequate discussion of significant cumulative impacts of a project:

- A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency.
- A summary of projections contained in an adopted general plan or related planning document or in an adopted or certified environmental document that described or evaluated regional or area-wide conditions contributing to the cumulative impact.

This EIR cumulative impact analysis uses the first ("list") approach.

5.B Projects Considered in Cumulative Analysis

Table 5-1 lists past, present, and reasonably foreseeable probable future projects within and near the Project area whose impacts could add to the Project's impacts. This table presents the planning jurisdiction, a brief description, the estimated construction schedule associated with each Project, and the distance of that Project to the Project area. Cumulative Project information listed in Table 5-1 is based on information supplied by the City of San José and the District, as well as information from other entities, review of EIRs, and review of information posted on agency websites.

TABLE 5-1
LIST OF PROJECTS EVALUATED FOR CUMULATIVE IMPACTS IN THE ALMADEN LAKE IMPROVEMENT PROJECT VICINITY

Project Number	Project Name	Location	Project Description	Distance from Proposed Project	Potential Cumulative Impact Topics	Schedule/Status
DISTRICT PROJECTS						
	Expedited Purified Water Program	Components are throughout Santa Clara County	Indirect potable reuse (IPR) project that could provide up to 10,000 to 24,000 acre-feet ("AF") annually of purified water and 18 miles of conveyance pipeline annually to recharge the Santa Clara Valley's groundwater subbasins and aquifers.	~5 miles west of Almaden Lake	Hydro/Groundwater; Utilities; Traffic; Hazards	Unknown/initial planning phase
	Upper Guadalupe River Flood Protection Project (SCVWD and USACE)	5.5 mile reach between Highway 280 and Blossom Hill Road	This Project is a partnership between the U.S. Army Corps of Engineers (Corps) and the District to plan, design and construct improvements along 5.5 miles of channel extending from Interstate 280 to Blossom Hill Road. Improvements include channel widening, construction of floodwalls and levees, replacement of road crossings and planting of streamside vegetation. Reducing flood frequency and bank erosion will improve water quality, while planned mitigation measures will give fish access to an additional 12 miles of habitat within and upstream of the Project reach. Includes seven Project areas: reaches 6, 7, 8, 9, 10, 11 and 12. (Reach 6 completed in 2012; Reach 10B completed in 2012; Reach 12 (Branham Lane to Blossom Hill Road) completed in 2016)	~1 mile north of Almaden Lake	Hydro; Utilities; Traffic; Hazards; Geo; Bio	Design and construction phase Construction schedule is currently unknown because it is dependent on receipt of Federal funding.
	Almaden Dam Improvements	Almaden Dam/Reservoir; Almaden Calero Canal	This Project plans, designs, and constructs improvements to the Almaden Dam Outlet Works.	Dam is ~5.5 miles south of Almaden Lake	Hydro; Utilities	Design ~~2018 – 2021~~ 2020 - 2024 Construction ~~2021 – 2023~~ 2022 - 2025
	Calero and Guadalupe Dams Seismic Retrofits	Calero Dam/Reservoir; Guadalupe Dam/ Reservoir	This Project plans, designs, and constructs improvements to the Calero and Guadalupe Dams.	Guadalupe and Calero Dams are ~3 and ~6 miles south of Almaden Lake, respectively.	Hydro; Utilities	~~2018 –2021~~ Design phase 2026 - 2029 Construction ~~2020 – 2024~~ 2030 - 2032

TABLE 5-1 (CONTINUED)
LIST OF PROJECTS EVALUATED FOR CUMULATIVE IMPACTS IN THE ALMADEN LAKE IMPROVEMENT PROJECT VICINITY

Project Number	Project Name	Location	Project Description	Distance from Proposed Project	Potential Cumulative Impact Topics	Schedule/Status
DISTRICT PROJECTS (cont.)						
	10 Year Pipeline Inspection & Rehabilitation	Pipelines are throughout Santa Clara County	This Project involves the inspection, planning, design, and renewal of the District's pipelines and tunnels to accomplish the following objectives: • Perform dewatering and internal inspections of District's pipelines and tunnels • Renew distressed pipe sections as required. Renewal encompasses the actions of repair, rehabilitation, and replacement. • Perform maintenance and repair activities as required • Replace old valves, flow meters, pipeline appurtenance assemblies, and piping as appropriate. • Modify failure prone pipeline appurtenance connections. This Project funds inspection and renewal work along the various pipelines and tunnels as identified below: • 2019: Cross Valley Pipeline, Calero Pipeline, Central Pipeline • 2023: Almaden Valley Pipeline, Santa Teresa Force Main, Rinconada Force Main, Santa Clara Conduit (SC Tunnel to SV1), West Pipeline (RWTP to Cox LV) • 2021: Parallel East Pipeline, West Pipeline, Santa Clara Distributary, Santa Clara Conduit, Anderson Force Main • 2023: Almaden Valley Pipeline, Santa Teresa Force Main, Rinconada Force Main, Santa Clara Conduit, West Pipeline (Cox LV to Grainger) • 2022: Pacheco Conduit, Pacheco Tunnel Reach 2, Santa Clara Tunnel, Penitencia Force Main, Penitencia Delivery Main, South Bay Aqueduct Retrofit Inspection	Almaden Valley Pipeline is ~0.5 mile south of and ~2 miles east of Almaden Lake	Utilities; Noise; Traffic; Geo; Hazards	July 2017 – June 2027

TABLE 5-1 (CONTINUED)
LIST OF PROJECTS EVALUATED FOR CUMULATIVE IMPACTS IN THE ALMADEN LAKE IMPROVEMENT PROJECT VICINITY

Project Number	Project Name	Location	Project Description	Distance from Proposed Project	Potential Cumulative Impact Topics	Schedule/Status
DISTRICT PROJECTS (cont.)						
	FAHCE Implementation	Guadalupe, Coyote, and Stevens Creek Watersheds	The FAHCE (Fish and Aquatic Habitat Collaborative Effort) Settlement Agreement in 2003 grew out of a 1996 Water Rights Complaint. Components of the conservation measures are likely to include revised reservoir operations rule curves, instream channel enhancements; and instream barrier removals. When implemented, the FAHCE Fish Habitat Restoration Plan (FHRP) will contain conservation measures designed to restore and maintain healthy fisheries in the Coyote Creek, Guadalupe Creek, and Stevens Creek watersheds.	Project sites are variable	Bio; Hydro	~~July 2020 – June 2024~~ 2022 – ongoing implementation after that
	Stream Maintenance Program (SMP)	Throughout Santa Clara County	The District owns and manages about 275 miles of streams. Each year, portions of these streams are inspected and prioritized for maintenance projects such as sediment removal, vegetation management, clearing of trash and debris, and stabilization of banks that have eroded during high water flows. The SMP ensures streams with completed flood protection projects continue to function as designed to protect homes and businesses.	Project sites vary but can include sites on Alamitos Creek, Guadalupe Creek and Guadalupe River.	Air Quality, Bio, Fisheries, Geology, GHG, Hydro, Noise	Ongoing program. Current permits run through 2024.
	Safe, Clean Water and Natural Flood Protection Priority B1: Impaired Water Bodies Improvement	Calero, Guadalupe, Almaden, and Stevens Creek Reservoirs	This group of projects helps the District meet surface water quality standards and reduce pollutants in streams, groundwater, lakes and reservoirs. Efforts are carried out in compliance with the Regional Water Quality Control Board (RWQCB) Total Maximum Daily Loads (TMDLs) standards as they continue to evolve (TMDLs are the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards). Under this Project the district employs treatment systems in reservoirs to reduce methylation of mercury, and also helps create realistic plans and expectations for reducing contaminant loads by engaging in the regulatory development process with the RWQCB for new and emerging contaminants.	~3 to ~6 miles south of Almaden Lake	Hydro, Bio	~~2014 – 2028~~ Ongoing

TABLE 5-1 (CONTINUED)
LIST OF PROJECTS EVALUATED FOR CUMULATIVE IMPACTS IN THE ALMADEN LAKE IMPROVEMENT PROJECT VICINITY

Project Number	Project Name	Location	Project Description	Distance from Proposed Project	Potential Cumulative Impact Topics	Schedule/Status
DISTRICT PROJECTS (cont.)						
	Safe, Clean Water and Natural Flood Protection Priority D1: Management of Revegetation Projects	Various	This Project supports District maintenance of at least 300 acres of existing revegetation projects throughout five watersheds, and provides for maintenance of future revegetation sites. Funding for this Project ensures that design objectives of all revegetation projects are maintained during the establishment period so that mitigation results in functional habitat that can support wildlife	Project sites are to be determined but may include: portions of the Upper Guadalupe River, Lower/Upper Berryessa, Upper Llagas Creek, and Lower Penitencia Flood Protection projects; and Lower Silver, San Francisquito, and Permanente Creeks.	Bio, Hydro	~~2014 – 2028~~ Ongoing
	Safe, Clean Water and Natural Flood Protection Priority D2: Revitalize Stream, Upland and Wetland Habitat	Guadalupe Watershed	Priority D2 projects allow the District to remove non-native, invasive plants, and revegetate habitat with native species when needed. Funding also restores degraded habitat between revegetated sites to create a more contiguous habitat corridor for wildlife. This Project includes targeted control of especially damaging non-native, invasive plant species such as giant reed (*Arundo donax*), as well as education for nearby landowners and other stakeholder groups on the control of harmful species. Priority D2 projects also help implement the Stream Corridor Priority Plans developed in Priority D3. • Completing 2.5 acres of non-native tree, shrub, and vine removals along the Guadalupe River for the Clean, Safe Creeks and Natural Flood Protection grant and to meet U. S. Army Corps of Engineers levee and flood protection criteria. Here are maps of pre-revitalization non-native and invasive plant cover prior to removal: • Non-native woody riparian vegetation at Guadalupe River	Project sites are to be determined.	Bio, Hydro	~~2014 – 2028~~ Ongoing

TABLE 5-1 (CONTINUED)
LIST OF PROJECTS EVALUATED FOR CUMULATIVE IMPACTS IN THE ALMADEN LAKE IMPROVEMENT PROJECT VICINITY

Project Number	Project Name	Location	Project Description	Distance from Proposed Project	Potential Cumulative Impact Topics	Schedule/Status
CITY OF SAN JOSÉ/OTHER PROJECTS						
			• Revitalizing approximately 14 acres of non-native habitats on the Guadalupe River, Stevens Creek, Saratoga Creek, and South San Francisco Bay.			
	South Bay Water Recycling Program	Cities of San José, Santa Clara, and Milpitas	The entire Project consists of 140 miles of pipeline and more are projected to be installed. The Project includes 5 pump stations and 3 above-ground storage reservoirs with combined capacity of 9.5 million gallons. Water is used for irrigation, industrial cooling, and toilet flushing in dual-plumbed commercial and municipal buildings.	Adjacent to Almaden Lake	Aesthetics, Hazards and Hazardous Materials, Hydrology and Water Quality	2012 – ongoing
	Communications Hill	Communications Hill Blvd @ Hillsdale Ave	The entire Project is a mixed use development for up to 2,200 residential units (single family and multifamily), up to 67,500 square feet of commercial/retail uses, 55 acres of industrial park uses, public parks, open space, trails, streets, stormwater facilities, and other associated supporting infrastructure on approximately 332 gross acres, as allowed within the Communications Hill Specific Plan Area.	~3 miles north of Almaden Lake		2014 – ongoing Approved/under construction
	County of Santa Clara Parks: Rancho San Vicente Staging Area Development	McKean Road @ Fontini Road, San José	New park entrance, public access to Calero County Park. 25 trailer spaces, 90 car parking spaces, turnout/overflow parking, restroom, picnic area.	~4.5 miles southeast of Almaden Lake		Complete ~~Status Unknown~~
	County of Santa Clara Parks: Calero County Park Trails	Calero County Park	County of Santa Clara. The county's project provides access to previously inaccessible areas adjacent to Calero Reservoir at Calero County Park with 5 miles of new multi-use, natural surface trails. The county also committed to comply with the Santa Clara Valley. Habitat Plan. These improvements to the park, in the Guadalupe watershed, will benefit residents from all over Santa Clara County. The county was awarded $200,000 in grant funds and the total project cost is estimated at $348,000.	~6 miles south of Almaden Lake	Hydro; Bio	Complete ~~Status Unknown~~

TABLE 5-1 (CONTINUED)
LIST OF PROJECTS EVALUATED FOR CUMULATIVE IMPACTS IN THE ALMADEN LAKE IMPROVEMENT PROJECT VICINITY

Project Number	Project Name	Location	Project Description	Distance from Proposed Project	Potential Cumulative Impact Topics	Schedule/Status
CITY OF SAN JOSÉ/OTHER PROJECTS (cont.)						
	County of Santa Clara Parks: Calcine Roads Remediation Project	Almaden Quicksilver County Park	The Project would remove calcine pavement used as surface cover on fire roads and trails (for purposes of this document, roads and trails shall be used interchangeably) in Almaden Quicksilver County Park (AQ County Park) that are identified as containing calcine pavements. The Project would include removal of all calcine pavement and replacement with clean soil; the repair of inboard drainage ditches; and stabilization of existing slumps and over steepened road edges.	~5 miles south of Almaden Lake	Hydro; Bio	Construction Complete
	County of Santa Clara Parks: Hacienda and Deep Gulch Remediation Project	Almaden Quicksilver County Park	The Hacienda and Deep Gulch Remediation Project (Project) is a mercury remediation and habitat restoration project in the Hacienda Furnace Yard Area of Almaden Quicksilver County Park (AQS County Park) and beneath the Alamitos Creek Bridge on Alamitos Road. AQS Park is a 3,977-acre area owned and operated by County of Santa Clara Parks and Recreation Department (County Parks). Alamitos Creek Bridge is owned and maintained by County of Santa Clara Roads and Airports Department.	~5 miles south of Almaden Lake	Hydro, Bio	Hacienda: October 2017 – October 2018 Deep Gulch: Unknown
	County of Santa Clara Parks: Los Gatos Creek Trail at Vasona County Park	Vasona County Park	A series of trail improvements for bikes and pedestrians	~5 miles west of Almaden Lake	Hydro, Bio, Recreation	Complete ~~In progress as of 9/26/16~~
	San José Parks: Almaden Lake All Inclusive Park Equipment Upgrade Project	Almaden Lake Park – Existing playground area in the northwest corner of the park	This Project will install specialized park equipment in the northwestern side of the park in the existing playground area. The footprint of the existing park will not change.	Adjacent to proposed Project footprint	Air Quality, Transportation, Noise, Recreation, Aesthetics	Initial planning phase – construction tentatively scheduled for 2021
	San José Parks: Branham Park Enhancements	Branham Park: Branham Lane @ Tupolo Drive	The work will include replacing the existing play lot including new play equipment, surfacing and shade covers, replacing the existing walking circuit with a new porous concrete walkway, planting vines along the chain-link fencing, two new security lights by the existing pavilion and irrigation repairs	~2 miles northwest of Almaden Lake	Hydro, Bio, Recreation	Status Unknown
	San José Parks: Del Monte Park Expansion	Del Monte Park; Auzerais Ave and Sunol St	Expand park by 4 acres	~5.5 miles north of Almaden Lake	Hydro, Bio, Recreation	Approved

TABLE 5-1 (CONTINUED)
LIST OF PROJECTS EVALUATED FOR CUMULATIVE IMPACTS IN THE ALMADEN LAKE IMPROVEMENT PROJECT VICINITY

Project Number	Project Name	Location	Project Description	Distance from Proposed Project	Potential Cumulative Impact Topics	Schedule/Status
CITY OF SAN JOSÉ/OTHER PROJECTS (cont.)						
	Samaritan Medical Center Master Plan Project	2577 Samaritan Court	Development of up to 360,000 square feet of commercial space and parking structures.	~4 miles	Transportation	Pending
	Equinox	San Ignacio and Great Oaks	579,000 sq ft facility.	~4 miles	Transportation	Pending
	Guadalupe Rubbish Disposal Co., Inc. Landfill-Gas-to-Energy Facility Relocation	15999 Guadalupe Mines Road	A Planned Development Permit Amendment to (1) decommission and deconstruct the existing landfill-gas-to-energy (LFGTE) plant and enclosed flare located within the eastern portion of the permitted landfill solid waste disposal area and (2) construct a new LFGTE plant and enclosed flare on an existing paved area adjacent to the existing materials recovery facility and equipment maintenance shop building, all within the boundaries of the Guadalupe Rubbish Disposal Co., Inc. Facility site.	~2 miles southwest of Almaden Lake	Transportation	Pending
	Santa Clara Valley Habitat Plan	Santa Clara County	The Santa Clara Valley Habitat Plan (Plan) provides a framework for promoting the protection and recovery of natural resources, including endangered species, while streamlining the permitting process for planned development, infrastructure, and maintenance activities. The Plan was adopted by the City of San José on January 29, 2013.	Countywide	Biological Resources	Implementation Phase

Cumulative projects provided in Table 5-1 are considered in the impact analysis below, as relevant to each CEQA resource area category. Geographic boundaries for each resource area impact analysis are discussed below, for each potential cumulative impact. As indicated in Table 5-1, a total of 25 projects are located proximate to project facilities.

5.C Cumulative Impact Analysis

5.C.1 Significance Criteria

Implementation of the Project would have significant cumulative impacts if it were to:

- Have impacts that would be individually limited but cumulatively considerable ("cumulatively considerable" means that the incremental effects of a project are significant when viewed in connection with the effects of past, present, and reasonably foreseeable probable future projects).

This EIR has determined that the Project would have no impacts related to Land Use, Mineral Resources, Population and Housing, ~~Tribal Cultural Resources,~~ and Wildfire (see Chapter 3, Environmental Setting, Impacts and Mitigation Measures). Therefore, the Project would not contribute to cumulative impacts related to these topics. The remaining topics addressed in Chapter 3 are described below.

5.C.2 Impact Summary

Potential cumulative impacts related to the construction and operations of the Project are described in this section by environmental resource topic, since the geographic scope of the impact can vary by topic. Each impact discussion below assesses the potential for the Project to contribute to significant cumulative impacts when considered in combination with the effects of other projects listed in Table 5-1. Table 5-2 presents a summary of the cumulative impacts.

TABLE 5-2
SUMMARY OF CUMULATIVE IMPACTS

Impact Number and Topic	Significance of Project's Contribution to Impact Before Mitigation	Significance Determination After Mitigation
5.A: Aesthetics	S	SU
5.B: Agriculture and Forestry Resources	LS	LS
5.C: Air Quality	S	LSM
5.D: Biological Resources	S	LSM
5.E: Fisheries Resources	S	LSM
5.F: Cultural <u>and Tribal Cultural</u> Resources	S	LSM
5.G: Energy	S	LSM
5.H: Geology and Soils	LS	LS
5.I: Greenhouse Gas Emissions	LS	LS
5.J: Hazards and Hazardous Materials	LS	LS

TABLE 5-2 (CONTINUED)
SUMMARY OF CUMULATIVE IMPACTS

Impact Number and Topic	Significance of Project's Contribution to Impact Before Mitigation	Significance Determination After Mitigation
5.K: Hydrology and Water Quality	S	LSM
5.L: Noise	S	LSM
5.M: Public Services	LS	LS
5.N: Recreation	LS	LS
5.O: Transportation	LS	LS
5.P: Utilities and Service Systems	LS	LS

NOTE: The significance determinations presented in this table assume implementation of all applicable federal, state, and local regulations as well as the mitigation measures identified in Chapter 3.

LSM = Less than Significant impact after mitigation
S = Significant impact
LS = Less than Significant Impact
SU = Significant and Unavoidable Impact

Aesthetics

Impact 5.A: Cumulative impacts on scenic resources (vistas, roadways, and designated scenic areas), scenic resources, or the visual character of public views of the Project area and its vicinity, or substantially increase light or glare in the Project area and its vicinity. (Significant and Unavoidable)

For visual impacts, the geographic scope of potential cumulative impacts includes the Project area and its immediate vicinity, defined as being located within 0.5 mile of the Project site.

Cumulative aesthetics impacts could occur if the Project and the cumulative scenario projects identified in Table 5-1 involved activities that would collectively result in substantial adverse effects on a scenic vista, substantially damage scenic resources including trees and historic buildings, substantially degrade the existing visual character or quality of public views of the Project vicinity, or create substantial new light or glare that would interfere with views. These effects could occur if construction of new facilities, removal of large trees or riparian canopy, or other proposed changes were to affect the same visual resources. Temporary cumulative aesthetics could occur if the cumulative Projects' construction schedules overlap with the Project.

The following cumulative scenario projects would be located or would include elements that would be within 0.5 mile of the Project:

- 10-Year Pipeline Rehabilitation (pipelines are 0.5 mile from the project)
- South Bay Water Recycling Program (pipelines are adjacent project)
- San José Parks: Almaden Lake All Inclusive Park Equipment Upgrade Project (within Project study area)

The following cumulative scenario projects could have elements that are located within 0.5 mile of the project:

- FAHCE Implementation (Guadalupe and Other Watersheds)
- D1: Management of Revegetation Projects (Guadalupe and other watersheds)
- D2: Revitalize Stream, Upland, and Wetland Habitat (Guadalupe Watershed)

All other cumulative scenario projects would be located more than 0.5 mile from the Project site, and would not cumulatively contribute to potential aesthetics impacts associated with the Project. All of the projects located or potentially located within 0.5 mile of the Project site would have construction / implementation schedules that would overlap with the Project. However, none of these cumulative scenario projects is anticipated to include substantial changes to aesthetics conditions in the Project vicinity. Specifically, the 10-Year Pipeline Rehabilitation would result in only short term, temporary construction related disturbances, that would be limited in extent to the pipeline route. Repair of the Almaden Valley Pipeline, if needed, would be discrete from the Project, temporary, and limited in extent, and therefore would not combine with the Project related visual impacts. The Almaden Lake Park upgrade would add recreation equipment in the vicinity of existing equipment, and would appear similar to existing facilities, a significant unavoidable impact. Once construction is completed, it is expected that aesthetics related impacts associated with these activities would be minimized. Implementation of the conservation, revegetation, and stream / upland / wetland habitat revitalization projects would be expected to result in either no change or a net beneficial effect on aesthetic conditions in the Project vicinity, wherein restoration of these areas would enhance the aesthetic characteristics and function of natural areas. Therefore, the Projects identified in Table 1 are not anticipated to result in a significant cumulative impact, during construction or operation. However, the Project's contribution to significant cumulative aesthetic resources impacts is cumulatively considerable impact.

Mitigation Measures

None available.

Agriculture and Forestry Resources

Impact 5.B: Cumulative effects on agriculture resources during construction. (Less than Significant).

For agriculture resources impacts, the geographic scope of potential cumulative impacts includes the Project area and its immediate vicinity, defined as being located within 0.5 mile of the Project site.

The Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland); and ~~would not~~ would not impact any nearby agricultural use such as

the commercial nursery or designated Grazing Land given the distance of those agricultural uses from the Project, and because none of the Project construction and operational requirements would affect use of those areas for agricultural use. Further, the Project would not affect the zoning designation of land currently zoned for agriculture, but not currently under agricultural use. With the exception of the Stream Maintenance Program, listed in Table 5-1, all of the cumulative projects are located more than 0.5 mile from the Program. The District's Stream Maintenance Program entails maintenance activities on the District's existing facilities. Because the Project and the cumulative projects would not affect areas currently under agricultural use, there would not be a significant cumulative effect to agricultural resources. Therefore, cumulative impacts associated with the Project would be less than significant.

Mitigation Measures

None required.

Air Quality

Impact 5.C: Cumulative emissions of air pollutants. (Less than Significant with Mitigation)

Criteria Pollutants (Less than Significant with Mitigation)

The geographic scope of potential cumulative air quality impacts encompasses the immediate Project vicinity for particulates and the San Francisco Bay Area Air Basin (SFBAAB) for criteria pollutants and their precursors. Any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. Cumulative impacts could occur if implementation of the Project and the projects listed in Table 5-1 resulted in increased construction emissions that violated air quality standards, contributed substantially to the regions non-attainment status for ozone and particulate matter, or exposed sensitive receptors to pollutants.

Impact 3.C-2 describes the cumulative impact that would be associated with construction and operational emissions of criteria pollutants of the Project. The proposed Project and other projects in the region, including those listed in Table 5-1, would result in emissions of criteria pollutants, which would be a significant impact. As concluded under Impact 3.C-2, the impact from construction-related criteria pollutant emissions would be less than significant, with the exception of for nitrogen oxides (NO_x), for which the impact would be reduced to a less than significant level with implementation of Mitigation Measures 3.C-1a and 3.C-1b. In addition, operation of the Project would result in negligible long-term criteria pollutant emissions from occasional worker vehicle trips to the Project site. Therefore, the Project would result in a cumulatively considerable net increase in NO_x pre-mitigation, but this impact would not be cumulatively considerable post-mitigation.

Toxic Air Contaminants (Less than Significant)

To evaluate cumulative impacts associated with sensitive receptor exposure to substantial pollutant concentrations, all toxic air contaminants (TAC) and $PM_{2.5}$ exhaust stationary and mobile sources within a 0.25-mile radius of the maximally exposed individual (MEI) were identified per Bay Area Air Quality Management District (BAAQMD) guidance for a complex source. According to the City of San José's Planning Division, there is currently one other construction project that would include installation of new park equipment at the existing Park on the corner of Almaden Expressway and Coleman Road that would occur in this radius during the Project's construction. Using the BAAQMD's Health Risk Screening and Distance Multiplier Tools, two existing TAC sources (one stationary source and one roadway) within the 0.25-mile radius were identified and their cancer and non-cancer chronic risks and annual average $PM_{2.5}$ concentrations were calculated and included in Table 5-3. Refer to Appendix B for the detailed calculations and methods to derive these values.

TABLE 5-3
CUMULATIVE PROJECT HEALTH RISK ASSESSMENT RESULTS[A]

Source	Health Risks at the MEI		
	Cancer Risk[b]	$PM_{2.5}$[c]	Chronic HI[d]
Proposed Project	48.4 (unmitigated) 5.1 (mitigated)	0.22 (unmitigated) 0.03 (mitigated)	0.15 (unmitigated) <0.01 (mitigated)
City of San José Park Improvements at Coleman Road and Almaden Expressway	≤5.1	≤0.03	≤0.01
Santa Clara Valley Water District FID: 1961; Plant No.: 18379	1.9	<0.01	0.01
Coleman Road	2.1	0.05	N/A
Cumulative	≤57.2	≤0.31	≤0.17
BAAQMD Cumulative Thresholds of Significance	100	0.8	10.0
Exceeds Threshold?	*No*	*No*	*No*

NOTE: Refer to Appendix B (Health Risk Assessment)

[a] The results represent the cumulative health risks associated with the Project and all other sources of TAC and $PM_{2.5}$ emissions within a 0.25-mile radius of the Project. The Chronic Hazard Index (HI) for Coleman Road is not available (N/A).
[b] Chances in 1 million.
[c] Concentrations are expressed as micrograms per cubic meter ($\mu g/m^3$).
[d] Hazard indices (HI) are dimensionless.

Table 5-3 presents the cumulative health risk assessment results for the mitigated Project's construction period. Based on the assessment methods described above, the Project combined with other cumulative sources is below the cumulative thresholds established by the BAAQMD; therefore, the Project would have a less than considerable contribution to toxic air contaminants. Based on Project related emissions, mitigation measures are proposed to reduce the emission of NO_x and dust ($PM_{2.5}$). With implementation of Mitigation Measures 3.C-1a and 3.C-1b, the exposure to the MEI would be further reduced to an incremental cancer risk of up to 14.2 in 1 million. The annual average $PM_{2.5}$ concentration at the MEI would be up to 0.12 micrograms per cubic meter ($\mu g/m^3$), and the chronic non-cancer hazard index would be no more than 0.03. With regard to operations, the Project

would result in negligible TAC emissions from occasional worker vehicle trips that would not be cumulatively considerable. The long-term cumulative impact on sensitive receptors would be less than significant.

As discussed under Impact 3.C-4 in Section 3.C, Air Quality, construction of the Project would cause a less than significant impact related to the generation of odors from diesel equipment emissions because construction activities would be spatially dispersed, and associated odors would dissipate quickly. In addition, any odors associated with the decay of organic materials exposed on the lake bottom during construction are not anticipated to result in substantial emission of odors, because water levels would be drawn down below the organic layer on the lake bottom, allowing sediments to partially dry out, rather than stagnate and generate odors. Long-term operation of the Project would result in no odors. There is no existing adverse cumulative condition related to odors to which the Project could contribute. Projects identified in Table 5-1 in the cumulative scenario are not expected to cause diesel-related odors that would intermingle with those of the Project and, thereby, cause a significant cumulative effect. The cumulative impact would be less than significant.

Mitigation Measures

Mitigation Measure 3.C-1a: *U.S. EPA Tier 4 Engines.* The District shall implement Mitigation Measure 3.C-1a.

Mitigation Measure 3.C-1b: *BAAQMD Basic Construction Mitigation Measures*. The District shall implement Mitigation Measure 3.C-1b.

Impact Significance after Mitigation. Less than Significant. The cumulative impacts from construction-related NO_x on regional air quality and TAC emissions on sensitive receptors would be reduced to less than cumulatively considerable and less than significant levels with implementation of Mitigation Measures 3.C-1a and 3.C-1b.

Biological Resources

Impact 5.D: Cumulative loss of sensitive biological resources during construction and operations. (Less than Significant with Mitigation)

The geographic scope of potential biological resources encompasses the jurisdictional waters, and habitats for special-status species within the Project area as well as biologically linked areas in the Guadalupe Watershed. This regional approach is appropriate because the habitats and wildlife species that could be affected by the Project and by the projects identified in Table 5-1 are part of a broader ecosystem, and the potential disturbance of individual areas could have repercussions for a wider region than the immediate Project vicinity.

As discussed in Section 3.D, Biological Resources, the Project could adversely affect special-status birds or nesting migratory birds and raptors in the Project area, including tricolored blackbird, nesting colonies of herons and egrets, Cooper's hawk, and other nesting migratory

birds and raptors, as well as roosting bats. Implementation of the mitigation measures applied in Section 3.D (i.e., Mitigation Measure 3.D-1a and 3.D-1b) would minimize potential direct impacts. The projects listed in Table 5-1 could also have the potential to affect these species, especially those projects that would directly affect waterways and riparian areas within the Guadalupe Watershed. These would include the Upper Guadalupe River Flood Protection Project, Almaden Dam Improvements, Calero and Guadalupe Dams Seismic Retrofits, FAHCE Implementation, Management of Revegetation Projects, and Revitalize Stream, Upland, and Wetland Habitat. These could result in similar effects as the Project. However, each of these projects would be required to complete CEQA analysis similar to that completed for the Project, but it unknown whether the CEQA process would identify and mitigate potential raptor and migratory bird related impacts associated with those projects Impacts on nesting birds and bats would be cumulatively considerable pre-mitigation, but less than cumulatively considerable with adherence to Mitigation Measures 3.D-1a and 3.D-1b.

As discussed in Section 3.D, Biological Resources, the Project would comply with the Santa Clara Valley Habitat Plan (SCVHP) which is designed to minimize impacts to sensitive habitats used by special-status species including California red-legged frog, foothill yellow legged frog, and western pond turtle. Projects that would directly affect waterways within the Guadalupe Watershed include the Upper Guadalupe River Flood Protection Project, Almaden Dam Improvements, Calero and Guadalupe Dams Seismic Retrofits, FAHCE Implementation, Management of Revegetation Projects, and Revitalize Stream, Upland, and Wetland Habitat. These could result in similar effects as the Project. However, each of these projects would be required to complete CEQA analysis similar to that completed for the Project, and most of these projects would also be subject to conditions of the SCVHP. Adherence to such conditions would ensure that cumulative scenario projects would not combine to result in a cumulatively significant impact.

Also discussed in Section 3.D, the Project would result in a temporary impact to riparian community and jurisdictional wetlands and waters that are located within or along the waterways of the Guadalupe Watershed. Implementation of avoidance and minimization measures contained in the District's Best Management Practices (BMP) Handbook (SCVWD, 2014), such as District BMPs: HM-8: Ensure Proper Vehicle and Equipment Fueling and Maintenance, and WQ-9: Use Seeding for Erosion Control, Weed Suppression, and Site Improvement would minimize temporary impacts on riparian habitat and jurisdictional waters, respectively. Additionally, District BMPs focusing on management of fill, restoration criteria for streams, preservation of water quality, management of erosion and sedimentation, weed suppression, and avoidance measures would minimize direct impacts. Furthermore, Project design overall would replace existing, low-quality lacustrine habitat with higher quality riparian, stream, and wetland habitat. In addition, as discussed in Section 2.E, the outlet pipeline would cross under Guadalupe Creek using horizontal directional drilling to install the pipeline beneath the creek. This would allow the bore pits to be located outside the riparian corridor and Project construction would not impact the Guadalupe Creek riparian corridor. While some of the projects listed in Table 5-1 could also have the potential to affect these habitats – namely those listed previously that would directly affect waterways in the Guadalupe Watershed – the Project would not meaningfully contribute to a cumulative

impact on riparian community or jurisdictional wetlands and waters. Therefore, this impact would be less than significant.

As described in Section 3.D, Biological Resources, the Project area is generally surrounded by built uses, which blocks terrestrial wildlife migration under existing conditions. The Project, however, would enhance and restore habitat connectivity along the segment of the Guadalupe Watershed within the Project area, and therefore would provide a net benefit to movement corridors for wildlife. Therefore, residual impacts from the Project would not combine with other cumulative scenario Project impacts, and this impact is considered less than significant.

The Project could conflict with local policies or ordinances protecting trees; however, as discussed for direct impacts in Section 3.D, adherence to Mitigation Measure 3.D-6 would ensure that tree protection measures would be implemented under the Project to protect trees and ensure compliance with applicable ordinances and policies. In addition to promoting the health, safety, and welfare of the city by regulating the planting, removal and maintenance of the community forest, pursuant to the Community Forest Master Plan and the City of San José Tree Policy Manual & Best Management Practices. Although the Project's pre-mitigation impacts are cumulatively considerable because other cumulative scenario projects may have similar impacts on trees, post-mitigation this impact would not be cumulatively considerable. Therefore, this impact is considered less than significant.

Mitigation Measures

Mitigation Measure 3.D-1a: *Nesting Bird Protection Measures.* The District shall implement Mitigation Measure 3.D-1b.

Mitigation Measure 3.D-1b: *Protective Measures for Bats.* The District shall implement Mitigation Measure 3.D-2.

Mitigation Measure 3.D-6: *Tree Protection Measures.* The District shall implement Mitigation Measure 3.D-3.

Impact Significance after Mitigation: Less than Significant with Mitigation. The impacts to Biological Resources from the Project considered together with past, present, and reasonably foreseeable future projects would be reduced to a less than significant level with implementation of Mitigation Measures 3.D-1a, 3.D-1b, and 3.D-6.

Fisheries Resources

Impact 5.E: Cumulative loss of special-status native fish species and their aquatic habitat during construction and operations. (Less than Significant with Mitigation)

The geographic scope of potential fisheries resources encompasses the waterways of the Guadalupe Watershed. This regional approach is appropriate because the habitats and wildlife

species that could be affected by the Project and by the projects identified in Table 5-1 are part of a broader aquatic ecosystem, and the potential disturbance of individual areas of the watershed could have repercussions for a wider region than the immediate Project vicinity.

As discussed in Section 3.E, Fisheries Resources, direct impacts of the Project would include impacts on special-status native fish species and their aquatic habitat during Project construction. Potential categories of impact, as discussed therein, could include direct impacts to fish, water quality and sediment quality impacts, underwater noise impacts, and alteration of benthic habitat. Construction related direct impacts would be significant, but minimized through the implementation of native fish relocation measures (Mitigation Measure 3.E-1~~a~~). Operation of the Project would result in a substantial net benefit to native fish species thanks to the proposed restoration activities, which would revitalize lotic fish habitat in the Project area. Cumulative scenario projects identified in Table 5-1 could include limited work along rivers, but would not include large scale alteration of waterways that would be expected to meaningfully affect native fish species. Therefore, and because the Project would result in strong long term benefits to fish habitat, impacts of the Project would not be expected to combine with other cumulative scenario project impacts, and therefore would not be cumulatively considerable. This impact is considered less than significant.

Under existing conditions, Almaden Lake represents a substantial barrier to fish migration, caused by entrainment and predation of migrating native fish within the lake. Project construction could temporarily interfere with fish migration during the non-migratory season. Other projects in the watershed that would have the potential to interfere with fish migration and that could be active during the same construction period (Upper Guadalupe River Flood Protection Project and Revitalize Stream, Upland, and Wetland Habitat) may implement fish management measures to ensure passage during migration seasons, in compliance with Endangered Species Act and CEQA mitigation requirements, but because such measures are currently unknown, conservatively, cumulative scenario projects would combine to result in a cumulatively significant impact. The Project's contribution to this impact would be cumulatively considerable, but rendered less than cumulatively considerable with implementation of Mitigation Measure 3.E-1~~a~~.

During operations, the Project would result in improved fish migration, by removing Almaden Lake as an existing barrier to fish passage. FAHCE implementation, Impaired Water Bodies Improvement, Management of Revegetation Projects, and Revitalize Stream, Upland and Wetland Habitats all have stewardship components that are designed to improve flow and habitat conditions that would benefit fisheries.

Finally, as discussed in Section 3.E, the Project would result in a less than significant impact with respect to potential conflict with local policies or ordinances protecting fisheries resources, or other applicable conservation plans. Because the Project would not conflict with these plans, the Project would not include any residual impacts that could combine with other impacts from cumulative scenario projects. Therefore, this impact would not be cumulatively considerable, and would be less than significant.

Mitigation Measures

Mitigation Measure 3.E-1~~a~~: *Native Fish Capture and Relocation*. The District shall implement Mitigation Measure 3.E-1~~a~~.

Impact Significance after Mitigation: Less than Significant with Mitigation. The impacts to Fisheries Resources from the Project considered together with past, present, and reasonably foreseeable probable future projects would be reduced to a less than significant level with implementation of Mitigation Measure 3.E-1~~a~~.

Cultural Resources and Tribal Cultural Resources

Impact 5.F: Cumulative increase in impacts on archaeological, historical resources, and tribal cultural resources. (Less than Significant with Mitigation)

The geographic scope of potential cumulative impacts on cultural resources and tribal cultural resources encompasses the archaeological and architectural area of potential effects (APE) for the Project area and its immediate vicinity. The Project would contribute to cumulative impacts on cultural resources, including historical, archeological, and paleontological resources, as well as tribal cultural resources, if the project and other cumulative scenario projects listed in Table 5-1 were to adversely affect the same historical or cultural resources, within the Project area and immediate vicinity.

As discussed in Section 3.F, Cultural Resources, while several prehistoric archaeological sites and one historic site have been identified in the general vicinity of Almaden Lake, none of these sites were found to be within the APE. Therefore, as discussed in Section 3.F, the Project would not interfere with these sites, and would not contribute to a cumulative scenario impact to known cultural resources or historic sites.

The Project has the potential for discovery of unknown historical resources and unknown archaeological resources although no archaeological sites were identified by records search or found during surface surveys. This impact would be significant. Implementation of Mitigation Measure 3.F-1b, Accidental Discovery of Archaeological Artifacts, Tribal Cultural Resources, or Burial Remains, would minimize potential impacts on unknown archaeological resources and human remains for all proposed Project elements. Most of the projects listed in Table 5-1 would likely involve ground disturbing activities and could encounter previously undiscovered archaeological resources during construction. Most of the Projects listed in Table 5-1 would not include activity within the Project APE. For those projects that could include activity within the Project APE (FAHCE Implementation; Management of Revegetation Projects; and Revitalize Stream, Upland, and Wetland Habitat), mitigation and avoidance strategies and management practices similar to Mitigation Measure 3.F-1b might be employed, but are currently unknown. Therefore, cumulative impacts would be significant and the Project's contribution would be cumulatively considerable pre-mitigation. Adherence to Mitigation Measure 3.F-1b, would assure that the Project would not meaningfully

contribute to a cumulatively significant impact on cultural resources or tribal cultural resources.

Mitigation Measures

Mitigation Measure 3.F-1a: *Preconstruction Training and Cultural Resource Monitoring*. The District shall implement Mitigation Measure 3.F-1a.

Mitigation Measure 3.F-1b: *Accidental Discovery of Archaeological Artifacts or Burial Remains*. The District shall implement Mitigation Measure 3.F-1b.

Impact Significance after Mitigation: Less than Significant with Mitigation. The impacts to Cultural Resources and Tribal Cultural Resources from the Project considered together with past, present, and reasonably foreseeable future projects would be reduced to a less than significant level with implementation of Mitigation Measures 3.F-1a and 3.F-1b.

Energy

Impact 5.G: Cumulative environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources. (Less than Significant with Mitigation)

The geographic scope of potential cumulative impacts associated with energy resources encompasses projects located within a 5-mile radius of the Project site. Potential cumulative impacts related to regional and local energy supplies and requirements are evaluated on a regional basis.

Construction of the Project in combination with the other projects in the region, including those listed in Table 5-1 would require the operation of construction equipment during excavation, grading, and materials hauling and could contribute to the regional use of petroleum-based fuels, or fossil fuels. Therefore, cumulative scenario effects on energy resources related to fuel consumption during construction would be significant, and the Project's contribution would be cumulatively considerable. If the cumulative scenario projects listed in Table 5-1 and the Project were to use energy resources in a wasteful, inefficient, or unnecessary manner, or be designed to increase dependency on non-renewable energy resources, it would conflict with state and local energy standards. Although each of the cumulative scenario projects listed in Table 5-1 would result in fossil fuel consumption during construction, these increases in demand would be temporary, and only directly associated with the proposed construction activities of each identified project. These construction activities could result in wasteful or inefficient use of energy fuels by using large amounts of fuel or energy over time which would be a significant impact. However, with the implementation of Mitigation Measure 3.C-1b (BAAQMD Basic Construction Mitigation Measures), construction equipment would be well maintained and properly tuned, and would limit equipment and vehicle idling, thus conducting construction activities in a fuel-efficient manner.

Therefore, post-mitigation the Project is not expected to contribute to a cumulatively considerable impact related to the wasteful, inefficient, or unnecessary consumption of petroleum-based, fossil fuel energy, and this cumulative impact would be less than significant.

The amount of electricity used for Project construction would be minimal, and would be limited to intermittent use of pumps to draw down or maintain low water levels in the lake. During Project operations, the amount of electricity required (ongoing pump operation) would amount to up to approximately 1,450 kWh per day, assuming both pumps operating at capacity. During most days, pumps would operate below capacity. This amount of electrical power is negligible when compared to the amount of electricity consumed in Santa Clara on an annual basis (i.e., 17,190 GWh in 2017). Therefore, the Project is not expected to contribute to a cumulatively considerable impact related to the wasteful, inefficient, or unnecessary consumption of electricity, and this cumulative impact would be less than significant.

The Project would not include the development or demolition of any buildings. Therefore, there would be no cumulative impact related to compliance with applicable energy and energy efficiency/conservation standards or codes, such as the California Building Standards or California Energy Code. Furthermore, like the Project, these cumulative scenario projects would not be designed or reasonably expected to increase reliance on fossil based energy; they would utilize blended fossil / renewable fuels typically sold in California, in accordance with the state Renewable Portfolio Standard requirements, and therefore would conform to applicable renewable energy plans.

Mitigation Measures

> Mitigation Measure 3.C-1b: *BAAQMD Basic Construction Mitigation Measures.* The District shall implement Mitigation Measure 3.C-1b.

Impact Significance after Mitigation: The impacts to Energy from the Project considered together with past, present, and reasonably foreseeable future projects would be reduced to a less than significant level with implementation of Mitigation Measure 3.C-1b.

Geology and Soils

Impact 5.H: Cumulative exposure of people or structures to geologic and seismic hazards. (Less than Significant)

The geographic scope of potential cumulative geologic and seismic impacts encompasses the San Francisco Bay Area region. Although many of the projects listed in Table 5-1 could have similar geologic impacts as the proposed Project, geologic and seismic impacts are generally site specific and depend on local geologic and soil conditions. All projects in the entire Bay Area region could expose additional people and structures to potentially adverse effects associated with earthquakes including seismic ground shaking and seismic related ground failure. However, site-specific geotechnical studies required by local building departments would determine how future projects could be designed to minimize exposure of

people to these impacts. Therefore, future development would be constructed to more current standards which could potentially provide greater protection than those of older structures throughout the region. Other current and future projects within the Bay Area region would also be required to adhere to current building standards with seismic design criteria that incorporates the most current science and understanding of geotechnical and seismic hazards such that damage or injury would be minimized.

As described in Section 3.H, Geology and Soils, potential geologic and seismic impacts associated with implementation of the Project could include fault rupture, ground-shaking effects and secondary ground-shaking effects (primarily liquefaction) (Impact 3.H-1). Fault rupture hazards are site specific and primarily depend on proximity to active fault zones within the region. As a result, projects do not combine to become cumulatively considerable. Ground shaking and liquefaction hazards are also dependent on site specific factors including distance to epicenter, duration of ground shaking, engineering characteristics of underlying materials and others. Regardless, all current and future construction would follow current engineering practices in accordance with building code requirements that minimize ground shaking hazards to less than significant levels. As indicated in the geotechnical investigation conducted for the proposed project, recommendations were made for the Project to address the identified liquefiable soils present. Liquefaction hazards are fully dependent on the site specific characteristics of underlying materials which can vary widely over short distances. Because of the this, the Project would not combine with other cumulative projects to become cumulatively considerable.

Construction and operation activities associated with all project elements are not anticipated to occur in areas susceptible to slope failures or in designated landslide zones due to the local topography of the Project area and due to the nature of the proposed improvements. Projects listed in Table 5-1 would occur within the general vicinity of the Project and would therefore not be anticipated to occur in areas susceptible to slope failures or in designated landslide zones. Therefore, the Project's contribution to cumulative impacts related to landslides, lateral spreading, subsidence or collapse would not be cumulatively considerable and would be less than significant.

Regarding soil erosion, development activities including construction could lead to increased erosion rates on site soils, which could cause unstable ground surfaces and result in eventual damage to roads, foundations and other improvements. Construction activities at the Project site would be similar to other current and future projects greater than 1 acre in size are required to comply with the National Pollution Discharge Elimination System (NPDES) Construction General Permit which contain erosion control requirements that would minimize the potential for erosion. The NPDES program requires the preparation and implementation of Stormwater Pollution Prevention Programs for construction activities that include Best Management Practices that ensure erosion control measures are included during construction. The Project would be required to comply with these regulations, as would other nearby past, present, and reasonably foreseeable development projects. Therefore, the proposed Project in conjunction with other nearby cumulative development would not have a cumulatively significant impact associated with erosion.

In addition, the Project as well as all the other current and future cumulative projects are required to adhere to building code requirements that address all geologic hazards. The California Building Code requires that a geotechnical investigation be prepared by a California licensed geotechnical engineer or engineering geologist and provide recommendations that minimize any identified hazards present onsite. Implementation of these recommendations in accordance with building code and U.S. Army Corps of Engineers requirements, as applicable, would reduce geologic hazards such that they would not be cumulatively considerable and would be less than significant.

Mitigation Measures

None required.

Greenhouse Gas Emissions

Impact 5.I: Cumulative effects related to greenhouse gas emissions. (Less than Significant)

The geographic scope of potential cumulative greenhouse gas (GHG) emissions, while technically global, is considered in regional and statewide terms for practical purposes. The Project's GHG emissions would contribute to cumulative climate change effects, as described under Impact 3.I-1.

As discussed in Section 3.I, Greenhouse Gases, an estimated 5,535 metric tons of carbon dioxide equivalent (CO_2e) emissions from Project-level construction activities would be emitted over the course of the 24 to 30-month construction period. This calculation includes CO_2e GHG emissions from off-road equipment, trucks, railroad hauling, and workers during construction, and worker trips. The total estimated annual operation and maintenance emissions that would be associated with the Project are approximately 70 metric tons CO_2e associated with direct GHG emissions from one truck trip every two weeks to maintain the new landscaping and indirect GHG emissions from an electric pump station that is conservatively assumed to run continuously (detailed in Appendix B).

These emissions would not exceed the BAAQMD adopted GHG significance threshold for projects other than stationary sources (1,100 metric tons/year of CO_2e). As stated in Section 3.I, when compared to regional and statewide GHG emissions, as well as the adopted BAAQMD significance thresholds for GHGs, the Project's GHG emissions would meet the State goals outlined in Assembly Bill (AB) 32 and other applicable GHG reduction plans, policies and regulations. All of the projects listed in Table 5-1 would also be subject to the same regional and statewide GHG regulations. It should be noted that GHG impacts are considered to be exclusively cumulative impacts; there are no non-cumulative GHG emission impacts (i.e., impacts associated with a specific project only) from a climate change perspective. Therefore, cumulative impacts related to the increase in GHG emissions and potential conflicts with GHG reduction plans, policies and regulations would

be less than significant, and the Project's contribution would not be cumulatively considerable.

Mitigation Measures

None required.

Hazards and Hazardous Materials

Impact 5.J: Cumulative effects related to hazardous conditions and exposure to or release of hazardous materials. (Less than Significant)

The geographic scope of potential cumulative hazards and hazardous materials impacts encompasses the Project area and immediate vicinity. Hazards and hazardous materials impacts are generally site-specific and depend on past, present, and future uses, as well as existing soil, sediment, and groundwater conditions. The FAHCE Implementation / Three Creeks Conservation Plan, Management of Revegetation Projects, and the Revitalize Stream, Upland, and Wetland Habitat projects potentially include elements that could be located within the same footprint as the Project.

As described in Section 3.J, Hazards and Hazardous Materials, direct project impacts would include those associated with handling mercury-containing bottom sediments from Almaden Lake. The potential for encountering hazardous levels of mercury in other parts of the Project area, for example, in shoreline soil, is limited, based on the results of soil chemical analyses reviewed in Section 3.J. The Project site does not contain any other known sources of hazardous materials, and outside of the lake bottom, the potential for encounter of hazardous levels of mercury is not anticipated. Additionally, implementation avoidance and minimization measures from the District's BMP Handbook (SCVWD, 2014), including District BMP HM-9 Ensure Proper Hazardous Materials Management and HM-11 Ensure Worker Safety in Areas with High Mercury Levels, would address the potential hazard of encountering previously unknown hazardous materials, including mercury, throughout the Project site. The Management of Revegetation and Revitalize Stream, Upland, and Wetland Habitat projects are both District projects, and therefore would also implement District BMPs HM-9 and HM-11 to minimize potential impacts related to hazardous materials. It is also assumed that the FAHCE Implementation project would require similar mitigation measures to reduce potential exposure of hazardous materials.

As described in Section 3.J, hazardous materials would be transported routinely to and from the Project area during construction, including during the export of mercury-laden sediments from the lake bottom. District BMP HM-9 Ensure Proper Hazardous Materials Management would be implemented during construction to minimize impacts associated with the accidental release of hazardous materials. As discussed previously, Management of Revegetation Projects and Revitalize Stream, Upland, and Wetland Habitat projects would

both be deployed by the District, and therefore would both implement District BMP HM-9 to minimize impacts related to the transport of hazardous materials. It is also assumed that the FAHCE Implementation project would require similar measures to reduce potential for accidental release of hazardous materials.

With respect to interference with emergency response, as discussed in Section 3.J, Project construction would only include construction activities for up to approximately 2 weeks along a public roadway (Winfield Blvd.). However, at least one lane would remain open at all times, minimizing direct impacts. With respect to cumulative scenario projects, the three cumulative scenario projects identified above as being potentially located within the Project area, would not include any construction in roadways. These projects would be deployed in riparian corridors, wetlands, streams, and other off-road areas, that are not used for emergency response operations. Therefore, none of the three applicable cumulative scenario projects would interfere with emergency response. Therefore, cumulative scenario impacts related to hazards and hazardous materials are expected to be limited, and the Project would not contribute to a cumulative scenario impact. Therefore, cumulative hazards and hazardous materials impacts would not be significant, and the Project's contribution would not be cumulatively considerable. This impact would be less than significant.

Mitigation Measures

None required.

Hydrology and Water Quality

Impact 5.K: Cumulative impacts related to the degradation of surface or groundwater quality, conflict with the Basin Plan, depletion of groundwater resources, alteration of drainage patterns or addition of impervious surfaces in a manner which would cause erosion or siltation, substantially increase runoff, cause flooding, exceed stormwater systems, or impede or redirect flood flows. (Less than Significant with Mitigation)

The geographic scope of potential cumulative hydrology and water quality impacts generally encompasses the Guadalupe River watershed, which includes the Project site as well as areas upstream and downstream of the Project site, and including underlying groundwater in the Santa Clara groundwater sub-basin.

As described in Section 3.K, Hydrology and Water Quality, the Project has the potential to degrade water quality as a result of construction-related soil erosion and accidental discharges of hazardous materials into downstream water bodies. However, Project construction impacts on water quality would be minimized via adherence to the requirements of the Construction General Stormwater Permit, as well as implementation of avoidance and minimization measures from the District's BMP Handbook (SCVWD, 2014). While most of the other cumulative scenario projects summarized in Table 5-1 would not implement District BMPs, all substantially sized projects (over one half acre) would also be required to adhere

to the requirements of the Construction General Stormwater Permit. Conditions of this permit are tailored to each project, in order to be sufficient to maintain beneficial use within the affected watershed. Therefore, adherence to the conditions of this required permit would ensure that potential water quality degradation would not interfere with applicable beneficial uses, and therefore would not result in cumulatively considerable construction period water quality degradation.

As part of the construction process, Almaden Lake would be drained to allow access to the lake bottom. When the lake is drawn down to near bottom, potential mixing of waters with bottom sediments could result in the release of increased sediment loads. Lake bottom sediments are known to contain high concentrations of mercury. In addition, after drawdown of the lake is complete, groundwater dewatering may be required to establish and maintain a dry lake bed to provide a working surface for the construction equipment which could release sediment, mercury, and other potential water quality pollutants to downstream areas. Releases of water containing elevated concentrations of sediment containing elevated mercury levels, in combination with historic mining activities in the watershed, could result in a cumulatively considerable contribution related to downstream water quality degradation. The Project's contribution to this impact would be rendered less than cumulatively considerable with implementation of Mitigation Measure 3.K-1, which would minimize the release of sediment and/or mercury-laden sediment downstream.

During operations, as discussed for direct impacts, the Project would have a net beneficial effect on the target water quality constituents identified for the Project. Therefore, for these constituents, including mercury, methylmercury, algae concentrations and phytoplankton blooms, nitrogen, phosphorous, and dissolved oxygen, the Project would not contribute to a cumulatively considerable degradation in water quality during operations. The Project would also hydrologically disconnect Almaden Lake from the remaining watershed, because water to feed the lake would be sourced from the Almaden Valley Pipeline, while the lake outfall would be used for groundwater recharge. Therefore, the Project would remove the lake as a contributor of degraded water quality to the watershed, and is expected to help alleviate any existing potentially cumulatively considerable water quality scenarios along the lower watershed, as relevant to the target constituents identified above. Moreover, the Project would remove a very large source of mercury and methylmercury to the watershed. By capping mercury-contaminated bottom sediments and isolating the lake from the watershed, the Project would ensure removal of what is presently the most highly polluted lake in California, with respect to methylmercury, from the Guadalupe River watershed. Therefore, operation of the Project would result in a net beneficial impact on water quality, especially with respect to mercury and methylmercury. Residual operation period water quality impacts of the Project would not combine with those of other cumulative scenario projects.

With respect to groundwater, Project construction would result in temporary and localized drawdown of shallow groundwater levels in and immediately adjacent to the Project area. Because drawdown would be limited in geographic extent, and because other projects in the immediate vicinity of the project (i.e., FAHCE Implementation; Management of Revegetation Projects; and Revitalize Stream, Upland, and Wetland Habitat) would not include

groundwater dewatering or other mechanisms that could contribute to groundwater drawdown, no cumulatively considerable construction period reduction in groundwater levels is anticipated in the Project vicinity. During operation, as discussed in Section 3.K, the Project would not rely on groundwater for supply. Operation of the Project would support groundwater recharge operations for the District, and could result in greater flexibility in delivering water to the Alamitos Percolation Pond/Los Capitancillos Percolation Ponds. By improving water quality in Almaden Lake, as discussed previously, the Project would further improve groundwater quality by reducing the amount of water quality pollutants in recharged groundwater. Therefore, the Project would not result in a reduction in groundwater levels during operation, and would not contribute to a cumulative scenario reduction in groundwater levels or in groundwater quality.

As discussed in Section 3.K, Hydrology and Water Quality, the Project would result in altered drainage patterns during construction, which could result in increased erosion or sedimentation downstream. However, during the construction period, stormwater in the Project area would be managed in accordance with the requirements of the Construction General Permit. Conditions of that permit would be set by the RWQCB. As discussed for direct impacts, the BMPs implemented under the Construction General Permit would be sufficient to minimize the release of water quality pollutants offsite. Additionally, the RWQCB is mandated to deploy BMPs to the extent needed to wholly ensure downstream beneficial uses are protected, even when considering discharges from multiple construction sites operating in accordance with the Construction General Permit. All projects identified in the Guadalupe River Watershed in Table 5-1 would also be required to obtain coverage under the Construction General Permit. Therefore, any residual releases from the Project site would not combine with other similar releases of water quality pollutants, and therefore would not contribute to a cumulative scenario reduction in construction period water quality.

As discussed for direct impacts, the Project would not meaningfully increase impervious surfaces, would not increase stormwater flows generated on site, would not contribute to increased flows downstream, and therefore would not contribute to a cumulatively considerable impact on stormwater volume.

The Project would alter erosion and siltation patterns at the Project site along the proposed creek channel. The restored creek would be designed to minimize erosion or sedimentation. Other cumulative scenario projects could also alter erosion and sedimentation along the Guadalupe River watershed. These would include the Upper Guadalupe River Flood Protection Project, Almaden Dam improvements, Calero and Guadalupe Dams Seismic Retrofits; FAHCE Implementation; and the Revitalize Stream, Upland, and Wetland Habitat (Guadalupe Watershed) project. However, the Project and the cumulative scenario projects that could affect erosion and sedimentation within the Guadalupe River watershed, would likely be designed to r minimize effects on downstream drainage patterns and erosion or siltation, but this is currently unknown. Based on the design of the Project, erosion and sedimentation effects would not be expected to combine with those of other cumulative scenario projects. Cumulative scenario alteration of erosion or siltation would not be cumulatively considerable, and would be less than significant.

As discussed for direct impacts, all drainage infrastructure needed to support the Project would be included in the Project design. The Project would not significantly increase impervious surfaces or otherwise generate additional stormwater, and would not result in an increase in the volume of stormwater discharged from the site. Therefore, the Project would not contribute to any cumulative considerable impact related to drainage infrastructure.

As discussed for direct impacts, the Guadalupe River downstream of Almaden Lake has been designed by the USACE and the District to contain and convey the 100-year flood event without causing flooding of adjacent housing or other development, even in the absence of the existing lake. Therefore, the existing design of the flood control system ensures accounts for the Project, ensuring that flows would pass safely without exceeding existing levees. Impact 3.K-3 discusses flooding impacts that could result if sheet piles used to separate the lake from the channel at the start of construction are not adequately sized. This impact is specific to the site and would not combine with other projects to contribute to cumulative effect related to flooding. Therefore, the Project would not contribute to any cumulatively considerable impact on flooding along the watershed downstream of the Project area.

Mitigation Measures

> Mitigation Measure 3.K-1: Monitor and Manage the Quality of Lake Discharges to Creek. The District shall implement Mitigation Measure 3.K-1.

Impact Significance after Mitigation: The impacts to water quality from the Project considered together with past, present, and reasonably foreseeable future projects would be reduced to a less than significant level with implementation of Mitigation Measure 3.K-1.

Noise

Impact 5.L: Cumulative increases in noise and vibration in the Project area. (Less than Significant with Mitigation)

The geographic scope of potential cumulative noise and vibration impacts encompasses the immediate Project area as well as areas adjacent to sensitive receptors that would be affected by the Project and construction access and haul routes that are located near noise-sensitive land uses. As described in Section 3.L, Noise, Project construction activities would contribute to the noise environment in the Project area. Existing residences on the northern, western, and eastern sides of the Project site are located within 500 feet of the proposed construction activities, and therefore have the potential to be adversely affected by Project construction. These residences could be significantly impacted by Project-related construction traffic noise. Implementation of Mitigation Measure 3.L-1~~a~~ would be required to reduce the impact to less than significant and would ensure that the Project would be consistent with applicable standards, ordinances, and the General Plan. In addition, because construction of the Project would exceed the applicable noise threshold criteria associated with off-site traffic if all Project construction traffic would access the site either via the Guadalupe River Trail from Coleman

Road (north of Almaden Lake Village) or Winfield Boulevard (south of Coleman Road) (worst case scenarios), this construction impact would be considered significant. Implementation of Mitigation Measure 3.L-1~~a~~ would ensure that this impact would be reduced to a less than significant level by restricting all Project-related construction traffic to the site via the Guadalupe River Trail to worker vehicles only (i.e., no haul truck access) and restricting hourly truck trips along Winfield Boulevard, south of Coleman Road, to no more than 70 trips per hour. Other cumulative scenario projects could contribute construction traffic that would lead to significant cumulative traffic noise impacts, but Mitigation Measure 3.L-1~~a~~ would assure the Project's contribution would be less than cumulatively considerable.

~~With regard to long-term Project operations, the estimated Day-Night Average Level (DNL) from the Project's water pump station at the closest sensitive receptors (residences at Almaden Lake Village) is 61 decibels (dBA) DNL, which would exceed the operational noise threshold of 55 dBA DNL for residential uses and cause a significant impact. However, implementation of Mitigation Measure 3.L-1b would result in installation of an enclosure to house the pump station that would reduce pump noise at the nearest residences to below the significance threshold.~~

Of the projects listed in Table 5-1, only the 10 Year Pipeline Rehabilitation Program and the Almaden Park equipment upgrade would include activities that would be located in the general vicinity of the Project site, with the Almaden Valley Pipeline approximately 0.2 mile from the Project site. Pipeline rehabilitation could be under construction at the same time as the Project, but at a distance of over 1,000 feet from the Project site, any cumulative increase in noise level would not be substantial.

Baseline noise levels without the Project were also evaluated for Coleman Road, which is the road that separates the nearest sensitive receptors from the Project's operational noise source. The ambient DNL for this road at the residential property line was estimated at 63 dBA, which is greater than the Project's estimated mitigated operational noise level. In addition, based on analysis provided in Section 3.O, Transportation, Project operation would not result in an increase in traffic in the Project area and would not otherwise increase noise levels relative to existing conditions, including at the nearest residential receptors.

As discussed in Section 3.L, Noise, the Project's construction and operation activities would not produce significant vibration levels that can cause architectural damage to nearby residences, and therefore this impact would be less than significant. None of the projects identified in Table 5-1 would overlap geographically with the Project to the extent that a cumulative increase in vibration levels would occur. Therefore, the Project would not be cumulatively considerable and the cumulative impact would be less than significant.

Mitigation Measures

Mitigation Measure 3.L-1~~a~~: *Construction Noise Logistics Plan.* The District shall implement Mitigation Measure 3.L-1a.

~~Mitigation Measure 3.L-1b: *Install a Fully Enclosed Pump Station.* The District shall implement Mitigation Measure 3.L-1b.~~

Impact Significance after Mitigation: Less than Significant. Implementation of Mitigation Measure 3.L-1~~a and 3.L-1b~~ would reduce Project noise impacts to a less than significant level and would ensure that the Project's contribution to cumulative noise impacts would not be cumulatively considerable.

Public Services

Impact 5.M: Cumulative effects on public services. (Less than Significant)

The geographic scope of potential cumulative recreation impacts encompasses the Project area and its vicinity, as well as development and other projects within 7 miles (a distance that encompasses several other cumulative projects and public service areas) of the Project site.

As discussed in Section 3.M, Public Services, the Project would result in a temporary increase in needs for public services during construction. However, these needs would be occasional and would not require the need for additional public services, such that new public service facilities would be required. Further, the Project would not include housing or otherwise increase population in the Project area in vicinity, such that new public service facilities could be required. Cumulative scenario projects that could result in additional need for public services during construction include the Upper Guadalupe River Flood Protection Project, Calero and Guadalupe Dams Seismic Retrofits, County of Santa Clara Parks: Hacienda and Deep Gulch Remediation Project (2017-2018), County of Santa Clara Parks: Los Gatos Creek Trail at Vasona County Park (2016-17), San José Parks: Branham Park Enhancements (2017-18), and San José Parks: Del Monte Park Expansion (2017-18). However, similar to the Project, occasional construction need for additional public services would not require the need for new public services facilities. Some cumulative projects do include additional housing and would result in increases in population that could require additional public service facilities. However, the Project would not result in a significant public services impact and would not contribute to a cumulative public services impact. Therefore, the Project would result in a less than significant public services impact.

Mitigation Measures

None required.

Recreation

Impact 5.N: Cumulative effects on recreational resources during construction. (Less than Significant)

The geographic scope of potential cumulative recreation impacts encompasses the Project area and its vicinity, as well as Park and recreational facilities, including parks, trails, and other public recreation facilities, within 7 miles (a distance that encompasses several other public recreational facilities) of the Project site.

As discussed in Section 3.N, Recreation, the Project would result in a temporary restriction of access to Almaden Lake, including restriction of access to the boat rental and boat launch; up to five reservable picnic areas; two open-use picnic areas, segments of Almaden Lake Trail; the beach and adjacent open area; and the amphitheater. These restrictions would remain in place during the 30-month construction period, but would cease upon completion of construction. As discussed for direct impacts, during the 30-month construction period, it is anticipated that local users would utilize other recreational opportunities available at other parks. Cumulative scenario projects that could result in restriction of access to recreational opportunities include the Almaden Park equipment upgrade, the Upper Guadalupe River Flood Protection Project, Calero and Guadalupe Dams Seismic Retrofits, County of Santa Clara Parks: Hacienda and Deep Gulch Remediation Project (2017-2018), County of Santa Clara Parks: Los Gatos Creek Trail at Vasona County Park (2016-17), San José Parks: Branham Park Enhancements (2017-18), and San José Parks: Del Monte Park Expansion (2017-18). Of these, the construction schedules for three projects would overlap in time with the project: Almaden Park equipment upgrade, Upper Guadalupe River Flood Protection Project, and Calero and Guadalupe Dams Seismic Retrofits. Potential for active construction on elements of these projects that would affect access to recreational facilities during the same period as the Project is expected to be limited. Even if closures to recreational facilities were to co-occur with the Project, there are several other parks and recreational facilities in the vicinity that would remain open and unaffected by construction of the Project or of cumulative scenario projects. Therefore, the Project's contribution to cumulative loss of recreational opportunities, or to cumulative increases in use of parks or recreational facilities, would not be cumulatively considerable and would be less than significant.

Mitigation Measures

None required.

Transportation

Impact 5.O: Cumulative traffic increases on local and regional roads. (Less than Significant)

The geographic scope of potential cumulative impacts related to transportation and traffic includes regional facilities (e.g., highways and freeways) and local roads providing access to the Project vicinity. The Project is located entirely within the City of San José, generally including roadways that provide access to the Project site, including SR 85, SR 87, Almaden Expressway, Coleman Road, Winfield Boulevard, Santa Teresa Boulevard, and Blossom Hill Road.

Traffic-related impacts resulting from the Project would be restricted to the two-and-a-half-year construction phase of the Project. Project operation would not impact or alter traffic or transportation, as discussed in Section 3.O, Transportation. As described under Impact 3.O-1, construction period activities would generate a temporary increase in traffic volumes on affected portions of area roadways. As discussed for direct impacts, the Project would most strongly increase traffic volumes along Coleman Road between Almaden Expressway and Winfield Boulevard and on Winfield Boulevard south of Coleman Boulevard, and would result in slight increase in traffic volumes, in comparison to existing conditions. Of the cumulative scenario projects identified in Table 5-1, only Almaden Park facility upgrade, the 10 Year Pipeline Rehabilitation, Management of Revegetation Projects, and Revitalize Stream, Wetland, and Upland Habitat projects would be in close enough proximity to the Project site that their implementation could meaningfully affect traffic volumes along Project-affected roadways, as identified for direct impacts. However, none of these projects would include new residential or commercial development, which could substantially increase traffic volumes. Additionally, none of these projects would include large scale construction activities in close proximity to the Project, such that their construction could meaningfully increase traffic volumes along roadways affected by the Project. Therefore, traffic related impacts of the Project are not expected to combine with impacts from other cumulative scenario projects; this impact would not be cumulatively considerable, and would be less than significant.

The Project would not install new roadway design features and therefore would not contribute to a roadway design related cumulative scenario impact related to increased road hazards. Similarly, Project construction would not introduce new uses (i.e., new types of vehicles) that would be incompatible with existing uses. Therefore, the Project would not contribute to a cumulatively considerable impact related to hazards caused by incompatible use; this impact would be less than significant.

With respect to emergency access, the Project would not require public road closure during construction, nor would it cause a significant increase in congestion on area roadways, that could limit or slow access or passage by emergency vehicles. Therefore, the Project would not contribute to a cumulatively considerable impact relating to emergency access. This impact is considered less than significant.

Finally, as discussed in Section 3.O, the Project would not eliminate or alter existing or planned transportation corridors or facilities, nor would it alter or cause changes to policies or programs that support alternative transportation. Therefore, the Project would not contribute to a cumulatively considerable impact relating to conflict with adopted policies, plans, or programs related to transportation. This impact is considered less than significant.

Mitigation Measures

None required.

Utilities and Service Systems

Impact 5.P: Cumulative impacts related to disruption of utility service or relocation of utilities. (Less than Significant)

The geographic scope of potential impacts on utilities and service systems is limited to the immediate Project vicinity where services could be disrupted and/or where utilities could require relocation. For landfill capacity, the geographic scope includes the service areas where disposal of construction-related waste could occur. For compliance with solid waste statutes and regulations, the geographic area encompasses the City of San José. For water supply, the geographic area encompasses water users in the northern portion of Santa Clara County and the future service area for recycled water supply within the City of San José.

As discussed under Impact 3.P-1, the Project would not require additional facilities to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years, it would not combine with impacts from other cumulative scenario impacts, and therefore would not result in a cumulatively considerable impact related to water supply. This impact would be less than significant.

With respect to stormwater infrastructure, the majority of stormwater generated on site would be managed on site, within the updated Almaden Lake, or in the restored river corridor. As discussed for direct impacts in Section 3.P, Utilities and Service Systems, the Project would not include substantial new impervious surface areas, and would not result in a net increase in stormwater generation. Therefore, the Project would not contribute to a cumulative scenario impact relating to stormwater utilities.

With respect to solid waste, the Project could require disposal of up hazardous waste that would be disposed of in Kettleman City or in Utah. However, none of the other projects identified in Table 5-1 is anticipated to require disposal of large volumes of hazardous waste, that would be disposed of in either of these landfills. Therefore, the waste disposal impacts of the Project would not combine with waste disposal impacts from other cumulative scenario projects, and would not result in a cumulatively considerable impact on solid waste. Additionally, construction wastes from the Project would be managed in accordance with San José's Construction and Demolition Ordinance, which prohibits construction and demolition

materials from being placed in the trash or being sent directly to a landfill. Other cumulative scenario projects in the vicinity of the Project would also be required to adhere to this ordinance, which would minimize the volume of waste landfilled during construction of cumulative scenario projects. Therefore, solid waste related impacts of the Project are not expected to combine with similar impacts from other cumulative scenario projects, and this impact would be less than significant.

Mitigation Measures

None required.

5.D References

Santa Clara Valley Water District (SCVWD). 2014. Best Management Practices (BMP) Handbook. Document No. W-751-037.

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CHAPTER 6
Other CEQA Issues

6.A Growth Inducing Impacts

Section 15126.2(e) of the California Environmental Quality Act (CEQA) Guidelines requires that an environmental impact report (EIR) discuss "the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas)… It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment."

The Almaden Lake Improvement Project (Project) would not directly induce growth because it does not involve the development of new housing or job centers that would attract additional population. Project construction would not extend roads or include other infrastructure that could indirectly induce growth. Given the relatively small size of the construction workforce (shown in Table 2-2 in Chapter 2, Project Description), Project construction would not be expected to induce demand for housing by attracting workers from outside the area, as workers are expected to be drawn from the local labor pool. Long-term operation of the Almaden Lake Improvement Project also would not increase the number of workers employed by the Santa Clara Valley Water District (District) or the City of San José for operation and maintenance activities at Almaden Lake or Alamitos Creek. As described in Chapter 2, Project Description, the purpose of the Project is to separate Alamitos Creek from Almaden Lake, reduce production of methylmercury and mercury in target fish in the lake, and remove potential lake entrainment of anadromous fish, while minimizing impacts to existing recreational features at Almaden Lake Park. The Project would use existing water supplies and would not create or expand a water supply source that could remove water supply limitations as a potential obstacle to growth.

Based on this analysis, the Project would not have a substantial growth-inducing impact, and no mitigation is required.

6.B Significant Unavoidable Impacts

In accordance with Section 21100(b)(2)(A) of CEQA and with Sections 15126(b) and 15126.2(c) of the CEQA Guidelines, the purpose of this section is to identify project-related environmental impacts that could not be eliminated or reduced to a less than significant level with implementation of all feasible mitigation measures, as identified in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures. The findings in this chapter are subject to final determination by the District as part of its certification of the Final EIR.

The Draft EIR identified a temporary significant unavoidable impact to the visual character of the Project area as the lake is drained and construction proceeds for two to three years. This impact would be reduced as restoration planting installed as part of the Project establish after a few years.

6.C Significant Irreversible Environmental Changes Which Would Be Caused by the Proposed Project Should It Be Implemented

CEQA Section 21100(b)(2)(B) and CEQA Guidelines Section 15126.2(d) require that an EIR identify significant irreversible environmental changes caused by implementation of the project. Construction of the Project would indirectly result in the commitment of nonrenewable natural resources used in the construction process. These may include gravel, soils, petroleum products, construction-related chemicals and paints, steel, and other materials. The Project would also result in the commitment of slowly renewable materials, such as wood products. This would not, however, be considered a significant adverse impact.

6.D Mitigation Measures Proposed to Minimize Significant Effects

CEQA Guidelines Section 15126.4 requires that an EIR describe feasible measures which could minimize significant adverse impacts. To this end, mitigation measures are incorporated into the analysis provided in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures of the Draft EIR, and are summarized in the Summary at the beginning of the ~~Draft~~ EIR. Please refer to those sections for additional information.

CHAPTER 7
Draft EIR Preparers

7.A Project Sponsor and Lead Agency

Santa Clara Valley Water District
5750 Almaden Expressway
San José, CA 95118

Capital Engineering Manager	Rechelle Blank
Associate Water Resources Specialist	Michael Martin
Project Manager/Associate Civil Engineer	Roxanne Grillo
Associate Civil Engineer	James Ujah
Senior Biologist	Zooey Diggory
Senior Biologist	Clayton Leal
Senior Water Resources Specialist	Kirsten Struve
Associate Water Resources Specialist	James Downing
Arborist Report (Veg. Prog. Specialist II)	John Chapman
Arborist Report (Veg. Prog. Specialist I)	Rebecca Wolff

7.B Authors and Consultants

Environmental Impact Report Consultant

ESA
550 Kearny Street, Suite 800
San Francisco, CA 94104

Project Director	Alisa Moore
Project Manager	Tina Will
Deputy Project Manager	Robert Eckard
Project Associate	Deja Newton
Project Description	Alisa Moore, Robert Eckard
Aesthetics	Samhita Saquib, Dave Davis
Agricultural and Forestry Resources	Dave Davis
Air Quality	Matt Fagundes
Biological Resources	Stephanie Bishop, Liz Hill, Chris Rogers, and Garrett Leidy
Cultural Resources	Heidi Koenig
Energy	Matt Fagundes
Geology and Soils	Robert Eckard, Michael Burns
Greenhouse Gas Emissions	Matt Fagundes
Hazards and Hazardous Materials	Michael Burns
Hydrology and Water Quality	Robert Eckard
Land Use and Planning	Erin Higbee-Kollu

Mineral Resources	Erin Higbee-Kollu
Noise	Matt Fagundes
Population and Housing	Erin Higbee-Kollu
Recreation	Erin Higbee-Kollu
Transportation	Jack Hutchison
Tribal Cultural Resources	Heidi Koenig
Utilities	Hunter Connell
Alternatives	Dave Davis, Hunter Connell, Alisa Moore
Cumulative Impacts	Hilary Finck, Robert Eckard, Alisa Moore
Growth-Inducting Impacts	Chris Mueller
Other CEQA Requirements	Chris Mueller, Dave Davis, Tessa Verhoef
Graphics	Ron Teitel
Word Processing	Lisa Bautista

Visual Field Work Investigation Consultant

Environmental Vision
2550 Ninth Street, Suite 205
Berkeley, CA 94710

Transportation and Circulation Consultant

Fehr & Peers
160 W. Santa Clara Street, Suite 676
San José, CA 95113

Environmental Investigation Consultants

Burleson Consulting
950 Glenn Drive, Suite 245
Folsom, CA 95630

InfraTerra
5 Third Street, Suite 224
San Francisco, CA 94103

McCord Environmental, Inc.
759 Bianco Court
Davis, CA 95616

Appendix A
NOP and Scoping Period Public Meeting Comments

ESA

APPENDIX A
Notice of Preparation and Scoping Period Public Meeting Comments

Appendix A includes the Notice of Preparation for this EIR (March 2014); and scoping letters submitted by local organizations, and state and federal agencies during the comment period. Additional questions and comments were presented by attendees during the public meeting on April 9, 2014. The major environmental concerns raised during the scoping period, and the EIR sections where the comments are addressed, are summarized in **Table A-1**.

TABLE A-1
COMMENTS ON THE NOTICE OF PREPARATION

Commenter	Comments	EIR Chapter/Section
California Department of Transportation (Caltrans)	A Traffic Impact Study (TIS) may be required, if the Project would generate traffic at volumes sufficient to impact the operations of nearby State highway facilities.	Section 3.O, Transportation
	A Transportation Management Plan (TMP) or construction TIS may be required for approval by Caltrans prior to construction, if the Project would restrict traffic and detours are needed on or affecting State highways.	Section 3.O, Transportation
	Transportation permits issued by Caltrans would be required, if the Project would require movement of oversized or excessive load vehicles on State roadways.	Section 3.O, Transportation
National Oceanic and Atmospheric Administration (NOAA)	Increase the area of the Project to include the contiguous ponded area between Coleman Road and Alamitos Diversion Dam.	Chapter 2, Project Description Chapter 4, Alternatives
	Develop alternatives for the EIR that include the ponded area between Coleman Road and Alamitos Diversion Dam, and assess the ability of the increased Project area to meet project objectives.	Chapter 4, Alternatives
San Francisco Bay Regional Water Quality Control Board (RWQCB)	A Clean Water Act (CWA) Section 401 water quality certification and a CWA Section 404 Permit from the U.S. Army Corps of Engineers (USACE) would be needed for fill impacts to waters of the U.S.	Chapter 2, Project Description (list of permits) Section 3.D, Biological Resources; Section 3.E, Fisheries Resources; Section 3.K, Hydrology and Water Quality
	A Report of Waste Discharge may be needed if the Project may impact waters of the State, even if such waters have been excluded from federal jurisdiction.	Section 3.K, Hydrology and Water Quality

TABLE 1-1 (Continued)
COMMENTS ON THE NOTICE OF PREPARATION

Commenter	Comments	EIR Chapter/Section
San Francisco Bay Regional Water Quality Control Board (RWQCB) (cont.)	According to Section 404(b)(1) Guidelines, discharges of fill material into regulated waters of the U.S. would be prohibited unless the discharge constitutes the least environmentally damaging practicable alternative (LEDPA) that would achieve the basic purpose of the Project.	Section 3.D, Biological Resources; Section 3.E, Fisheries Resources; Section 3.K, Hydrology and Water Quality Chapter 4, Alternatives
	According to Section 404(b)(1) Guidelines, the Project should sequence proposals affecting water body area, functions, and values in the following order: first avoid impacts to the extent possible; then minimize impacts to the extent possible, and finally adequately compensate for the loss.	Section 3.D, Biological Resources
	Under the CWA Section 401 water quality certification, the District would need to exhaust all impact avoidance and minimization measures before relying on compensatory mitigation to determine the LEDPA.	Section 3.D, Biological Resources;
	Include in the EIR hydrologic and sediment transport studies to determine if the new channel design is appropriate to pass the sediment load and stream flow and would not result in any geomorphic changes to channel shape or slope upstream and downstream of the Project site or require frequent maintenance to remove sediment deposited within the channel.	Section 3.K, Hydrology and Water Quality
	Demonstrate in the hydrogeomorphic analysis that the Project design would not cause channel scour or sedimentation downstream and/or create channel slope instabilities.	Section 3.K, Hydrology and Water Quality
	If the Project includes rock slope protection and concrete lining of the channel bed and bank, demonstrate in the EIR, supported by engineering analysis, that bioengineering methods are technically infeasible and that hardscape methods are necessary based on the Project site sheer stresses.	Chapter 2, Project Description Section 3.K, Hydrology and Water Quality
	Analyze in the EIR factors that contribute to erosion and evaluate watershed processes as well as the influences acting on a smaller, more localized reach level which affect erosion processes at individual Project sites.	Section 3.K, Hydrology and Water Quality
	Consider in the EIR all aquatic resource functions together, such that reduction in erosion potential is considered in together with direct loss of aquatic habitat from stream bank rock slope protection and concrete lining of the channel bed and bank.	Section 3.E, Fisheries Resources; Section 3.K, Hydrology and Water Quality
	Include a discussion of the adverse impacts to water quality if the maintenance road would be paved and discuss Project alternatives that would result in fewer impacts to waters of the State, such as topping the maintenance roads with gravel instead of asphalt where possible or routing the runoff through vegetated areas.	Chapter 2, Project Description Section 3.K, Hydrology and Water Quality
	Analyze in the EIR how changes in stream flow velocities may result in erosion, sediment deposition, and changes in channel form in Almaden Lake, Alamitos Creek, and Guadalupe River.	Section 3.K, Hydrology and Water Quality

TABLE 1-1 (Continued)
COMMENTS ON THE NOTICE OF PREPARATION

Commenter	Comments	EIR Chapter/Section
San Francisco Bay Regional Water Quality Control Board (RWQCB) (cont.)	Include in the EIR appropriate best management practices (BMPs) to mitigate impacts, if hydrologic and geomorphic studies indicate adverse impacts to biological resources from the Project.	Section 3.E, Fisheries Resources; Section 3.K, Hydrology and Water Quality
	Analyze in the EIR how upstream fish migration may be impacted, and as necessary, incorporate mitigation measures such as modifying box culvert and bridge replacement design to maintain upstream fish migration.	Section 3.E, Fisheries Resources
	Discuss in the EIR any existing water rights for the Percolation Pond, Almaden Lake, and Alamitos Creek and if any revisions to the existing or new water rights would be required.	Chapter 2, Project Description
	Identify in the EIR buffers around staging areas as a mitigation measure, and consider making the buffer area 100 feet around all waters of the State in the Project area to avoid water quality and habitat impacts from Project staging areas.	Section 3.D, Biological Resources; Section 3.E, Fisheries Resources; Section 3.K, Hydrology and Water Quality
Santa Clara Valley Audubon Society (SCVAS)	Analyze the potential of herbicides, insecticides and rodenticides to impact habitats during the construction and the projected lifespan of the Project, and consider disallowing use of rodent baits and other rodenticides onsite.	Section 3.D, Biological Resources; Section 3.K, Hydrology and Water Quality
	List all the biocides that may be used on the Project site.	Section 3.D, Biological Resources; Section 3.K, Hydrology and Water Quality
	Analyze potential for direct and secondary poisoning of birds and wildlife during construction and operations.	Section 3.D, Biological Resources
	Describe and analyze impacts to nesting egrets and heron species at Almaden Lake.	Section 3.D, Biological Resources
	Consider impacts to upland nesting habitat, particularly the Western Pond Turtles.	Section 3.D, Biological Resources
	Consider keeping paths, trails, and access roads on the levees crossing the lake unpaved, and, if plans exist to pave them, describe impacts to bird watching.	Chapter 2, Project Description Section 3.N, Recreation
April 9, 2014 Public Meeting Comments	Include levee size and details; movement and management of construction materials.	Chapter 2, Project Description
	Second island: do not support use of second island for boating; people will bother the birds on the island; justification and need for second island; do not include the second island.	Chapter 2, Project Description
	Boating facility: will people be allowed to bring boat trailers and boats? Describe whether parking lot expansion for boating area will be included	Chapter 2, Project Description
	Fish and swimming: How will the Project affect the existing fish population in the lake? Will catch and release still be available? Permission for swimming in the lake; separation of predator and native fish; restrictions for non-native fish species in the new lake or restored stream; steelhead study completion.	Chapter 2, Project Description Section 3.E, Fisheries Resources; Section 3.N, Recreation

TABLE 1-1 (Continued)
COMMENTS ON THE NOTICE OF PREPARATION

Commenter	Comments	EIR Chapter/Section
April 9, 2014 Public Meeting Comments (cont.)	Wildlife: Relocation of wildlife during construction; development of a landscaping plan to encourage birds and native plants/animals to grow; what can be done about seagulls?	Chapter 2, Project Description Section 3.D, Biological Resources; Section 3.E, Fisheries Resources
	Lake questions: Size difference for east lake; cap material for bottom of lake	Chapter 2, Project Description
	Methyl Mercury: will the water flowing through the area always have mercury? Mercury-bearing silt; what if target methylmercury levels are not achieved? Potential underground water contamination with methylmercury, and percolation to downstream ponds.	Section 3.K, Hydrology and Water Quality
	Other alternatives: what happened to the pipe alternative? Can any of the [original] four alternatives end up as the final choice? Cost of contaminant removal.	Chapter 2, Project Description Appendix A; cost is not considered under CEQA

NOTICE OF PREPARATION

From: Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

Project Title: Almaden Lake Project

Project Location: Almaden Lake, San Jose, California.

The Santa Clara Valley Water District will be the Lead Agency and will prepare an environmental impact report for the above project. The District needs to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but **not later than 30 days after receipt of this notice**. The District will also hold a scoping meeting to provide an additional opportunity for input on the scope and content of the information to be addressed in the draft EIR. The scoping meeting will be held at **6:30 pm on Wednesday, April 9, 2014,** at Castillero Middle School, 6384 Leyland Park Drive, San Jose.

Please send your response to:

Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
(408) 630-3095
michaelmartin@valleywater.org

Please provide the name of a contact person in your agency.

Beau Goldie
Chief Executive Officer

3-27-14
Date

Notice of Preparation
Draft Environmental Impact Report
Almaden Lake Project
Santa Clara County, California
March 2014

Introduction
This notice announces that a draft Environmental Impact Report (EIR) will be prepared for the Almaden Lake project (Project). The EIR will identify and evaluate possible environmental impacts of Project alternatives, and develop strategies to avoid, reduce, or compensate for any significant impacts.

As the lead agency responsible for compliance with the California Environmental Quality Act (CEQA), the Santa Clara Valley Water District (District) has determined that the Project may have a significant impact on the physical environment, and has decided to prepare an EIR to provide ample opportunity for public disclosure and participation in the planning and decision making process. The purpose of the draft EIR process is to develop and assess a recommended plan and alternatives for the Project and to avoid and mitigate significant adverse effects on environmental resources, while aiming to achieve the primary project objectives.

This document, which serves as the Notice of Preparation (NOP) required by CEQA and the state's CEQA Guidelines (CCR §15082), contains a brief description of the Project, including its goals and objectives, the Project alternatives identified to date, possible environmental impacts, and the resulting need for an EIR. It also discusses the process that will be used to determine the scope of analysis in the EIR, and provides an overview of the opportunities for participation in review of the EIR, along with contact information.

Project Overview
The District is undertaking the CEQA environmental review process as part of the overall Project review and design process. Pending the outcome of the environmental review process and any subsequent design revisions to improve the project, the proposed Project will be submitted to the District Board of Directors for their review and potential approval. This process is aimed to provide the public with a clear understanding of the activities, elements, and methods involved with the Proposed Project. However, this project description does not presume that the proposed Project is considered approved, or will necessarily be approved until the complete environmental and planning process occurs according to CEQA guidelines and internal District Project review and approval process.

Background
Almaden Lake is located within the City of San Jose's Almaden Lake Park. The lake is a 32-acre man-made water body that is located at a site that was once a privately owned gravel quarry. The historic quarry operation was located along the east side of the downstream end of Alamitos Creek and comprised of two main large pits. Over time, heavy storm events washed away the creek's bank edge that separated the creek from the quarry making it into one large comingled water body.

Almaden Lake Park was developed as a partnership between San Jose and the District in the late 1970s where both agencies purchased lands encompassing the lake and surrounding park land. Most of the property surrounding the lake is owned by the City and most, but not all, of the water area is owned by the District. The District is responsible for flood protection, water resource management, and stream stewardship of the lake. The City is responsible for recreational use of the park, graffiti abatement, patrolling, and any damage to District facilities resulting from public use. The park is a treasured part of this area and offers pathways, playgrounds, picnic areas, bocce courts, swimming, fishing, and boating to the community. However, since August of 2010, the lake has been closed to swimming because of either high concentrations of coliform bacteria, blue-green algae, or lack of City funds to operate the swimming activity.

Almaden Lake lies within the Guadalupe Watershed immediately upstream of the Guadalupe River, Guadalupe Creek, and Alamitos Creek confluence. The Guadalupe Watershed is known to be utilized by the Central California steelhead trout. Migrating steelhead must pass through the lake to reach Alamitos Creek's upstream spawning habitat. Juvenile steelhead trout pass through the lake during out-migration when they head downstream for the ocean. Since the threatened Central California steelhead trout is a federally-listed species, any alternatives which may affect them fall under the jurisdiction of the federal Endangered Species Act and will require consultation and approval from the National Marine Fisheries Service and the California Department of Fish and Wildlife.

Almaden Lake has little vegetation along its banks. The vegetation that does exits provides some habitat for nesting birds, but no known occurrences of special status bird species occur within the area. The lake itself provides open water habitat for seagulls, geese, and several species of duck. Maintenance of the vegetation along the lake's banks is minimal except for some management activities on the island located in the south-central portion of the lake. This large vegetated island serves as a communal roost for several species of wading birds. The District recently completed a four year project to remove the arundo vegetation from the island. The arundo previously covered 100% of the island. Native riparian trees were planted as the arundo was removed to create alternative habitat for the displaced rookery. The riparian vegetation will require a couple of years of maintenance until it becomes self sufficient.

The water surface in Almaden Lake is influenced by the operation of the Alamitos Flashboard Dam. The Alamitos Flashboard Dam is part of the Guadalupe Water Supply Management System and is located on the Guadalupe River approximately 1700 feet downstream of Almaden Lake, and immediately downstream of the Alamitos Creek and Guadalupe Creek confluence. The dam is made up of wood panels and is part of the District's county-wide water supply infrastructure that develops local water supplies from the District's water rights. The wood-paneled flashboard dam is installed to impound water in the channel that is diverted into the nearby District percolation ponds. When the Alamitos Flashboard Dam is installed, the water surface elevation in Almaden Lake increases by approximately 5 feet. Although the dam may be installed or removed at anytime, it is typically installed in April and removed in December of each year to not impede flow conveyance during winter storm events. There is no record of any historical flooding in the Project area and Almaden Lake currently has the capacity to convey a 100-year storm event.

Alamitos Creek flows through Almaden Lake and stretches more than seven miles upstream, five miles from the New Almaden Quicksilver Mines and the heart of mercury contamination. Mercury contamination can trace its roots to the Gold Rush days of the 1800's. Mercury was essential to the process of separating gold from ore and plenty of it could be found in the hills

above San Jose, and especially at the New Almaden Mines. The New Almaden Mines would become the largest mercury mine in North America and work there would ultimately seep an estimated 6,500 tons of mercury into the local systems of creeks and rivers between 1850 and 1920.

Because Almaden Lake is located downstream from where the historic mining activities occurred, mercury-laden sediment has ended up in the lake. As a result, the water in the lake has deteriorated from the influx of elemental mercury that has settled at its bottom and is converting to methylmercury as well as producing high concentrations of methylmercury in the lake fish. To address the methylmercury problem, the San Francisco Regional Water Quality Control Board derived site-specific mercury water quality objectives for mercury in fish tissue and a total maximum daily load (TMDL) of mercury in water for Almaden Lake.

Goals and Objectives

The District is under order by the San Francisco Bay Regional Water Quality Control Board to meet site-specific mercury water quality objectives for Almaden Lake (October 2008 Basin Plan Amendment). As a result of the RWQCB mandate and as part of the District's commitment to the Guadalupe Watershed, the Project proposes to address the water quality issues related to mercury and anadromous fish (i.e., those fish that migrate upstream from saltwater to freshwater to spawn, such as steelhead and salmon, also known as migratory fish).

The objectives of the Project are as follows:

- Reduce mercury in fish and production of methylmercury to meet applicable water quality objectives as defined in the 2008 Basin Plan Amendment.
- Reduce thermal barrier to anadromous fish migration.
- Remove entrainment and impacts from predatory species to anadromous fish.
- Minimize impacts to recreational features.

Project Description

The District proposes a project that would substantially reduce the amount of methylmercury produced in the lake and improve conditions for anadromous fish. The Project would include the following elements:

- Isolating Alamitos Creek in an approximately 210-foot wide channel separated from the remaining lake to its east with a new levee.
- Re-contouring the bottom of the lake to a more level surface and capping the existing mercury laden sediment with at least five feet of clean fill.
- Expanding the open park area to the west of the lake by approximately two acres into existing lake and beach area.
- The lake would draw water from the restored Alamitos Creek channel and be connected to Alamitos Percolation Pond to develop a flow through system.
- The embankment between the restored creek and lake would be a minimum of 40-feet wide with dual use as a maintenance road and trail.
- Existing island to be expanded and banks stabilized.
- A second island, up to 0.75 acres in area, would be established in the lake.
- Installation of riparian vegetation along both banks of the new channel and islands.

Topics to be Analyzed in the Draft EIR

Based on the proposed project's potential for significant impacts on the environment, the District will prepare an EIR. No environmental studies have yet to be conducted in support of the Project; however the following general impacts can be inferred from existing information:

Aesthetics

Residents in neighborhoods that overlook the lake to the east enjoy views of the open water. They have expressed a concern about any changes to this view resulting from the Project. The lake is also highly visible to motorists along Almaden Expressway and Coleman Avenue. The proposed Project would divide the lake into segments with new levees that would run through the existing footprint.

Biological Resources

Steelhead are known to utilize Alamitos Creek upstream of Almaden Lake. Some of the objectives of the Project are to improve habitat for steelhead through the Project area. The Project is expected to have a beneficial impact to steelhead. The only other sensitive species with potential to occur at the site is western pond turtle. As open water will still be available after Project implementation, impacts to western pond turtle are not expected to be significant. Both species may be impacted during construction, but these can likely be minimized through construction timing and pre-construction surveys.

Cultural Resources

The site was previously used as a quarry and Project activities mostly involve filling of the site, therefore impacts to cultural resources are not expected.

Water Quality

The objective of the Project is to improve water quality within and coming out of the lake. The Project will be designed to reduce the production of methylmercury and isolate the cold water of the creek from warm water within the lake. However, reducing the depth of the lake may have impacts on water temperature, algae growth, and odor. Construction related impacts to water quality will likely occur but can be minimized by standard BMPs. The Project is expected to have an overall beneficial impact to water quality.

Air Quality / Noise / Traffic

The construction of levees through the site and capping the bottom of remaining lake is expected to require a significant amount of soil. It could require thousands of truckloads of material to accomplish this task. The amount of traffic (and associated dust, air emissions and noise) generated during construction is potentially significant. Neighbors have also expressed a concern about noise and traffic impacts from recreational activities if swimming and/or boating opportunities are moved from the west side of the lake to the east side, or if playing fields are added to the east side of the lake adjacent to existing residential development.

The EIR will serve to further assess the proposed project's effects on the environment, to identify significant impacts, and to identify feasible mitigation measures to reduce or eliminate potentially significant environmental impacts. An analysis of alternatives to the proposed project will also be included in the EIR. Other topics to be analyzed in the EIR include, but are necessarily limited to: soils, greenhouse gas emissions, hazards and hazardous materials, land use, recreation, and utilities. Responses received to this NOP may modify or add to the preliminary assessment of potential issues addressed in the EIR.

Environmental Procedures and Public Scoping Meeting

This NOP initiates the CEQA process through which the District will refine the range of issues and project alternatives to be addressed in the EIR. Comments are invited on the proposal to prepare the EIR and on the scope of issues to be included.

Please submit any comments within 30 days of receipt of this notice to Michael Martin, the District's environmental planner for the Almaden Lake project, at the Santa Clara Valley Water District (see *Contact Information* below). In conjunction with the 30-day review period for the NOP, the District will hold a scoping meeting to provide an additional opportunity to learn about the project, ask questions, and provide comments about the scope and content of the information to be addressed in the EIR. The scoping meeting will be held at 6:30 pm on Wednesday, April 9, 2014, at Castillero Middle School, 6384 Leyland Park Drive, San Jose.

After the 30-day review period for the NOP is complete, a draft EIR will be prepared in accordance with CEQA, as amended (Public Resources Code §21000 et seq.), and the State Guidelines for Implementation of CEQA (CCR §15000 et seq.).

Once the draft EIR is completed, it will be made available for a 45-day public review and comment period. Copies of the draft EIR will be sent directly to those agencies commenting on the NOP, and will also be made available to the public at a number of locations, including the District headquarters and public libraries in the area. Information about availability of the draft EIR will also be posted on the District's website (http://www.valleywater.org).

Contact Information

For further information, contact the following:

Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 630-3095
Michaelmartin@valleywater.org

Additional information relevant to the project and the EIR can also be found at http://www.valleywater.org.



Almaden Lake Project Area

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
P.O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-6053
FAX (510) 286-5559
TTY 711
www.dot.ca.gov

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Water District

May 13, 2014

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Mr. Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3614

Dear Mr. Martin:

Almaden Lake Project – Notice of Preparation (NOP)

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the project referenced above. We have reviewed the NOP and have the following comments to offer.

Traffic Impact Study (TIS)
During construction, this project may generate traffic at volumes sufficient to impact the operations of nearby State highway facilities and it may be necessary to prepare a TIS. If it is found that a TIS is not required, please provide a verifiable explanation for this finding. The following criteria are among those that may be used to determine whether a TIS is warranted:

1. The project will generate over 100 peak hour trips assigned to a State highway facility.

2. The project will generate between 50 and 100 peak hour trips assigned to a State highway facility, and the affected highway facilities are experiencing noticeable delay; approaching unstable traffic flow (level of service (LOS) "C" or "D") conditions.

3. The project will generate between one to 49 peak hour trips assigned to a State highway facility, and the affected highway facilities are experiencing significant delay; unstable or forced traffic flow (LOS "E" or "F") conditions.

We recommend using the Caltrans *Guide for the Preparation of Traffic Impact Studies* for determining which scenarios and methodologies to use in the analysis. It is available at the following website address: http://dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf. As the lead agency, the Santa Clara Valley Water District (SCVWD) is responsible for all project mitigation, including any needed improvements to State highways.

Transportation Management Plan (TMP)
If it is determined that traffic restrictions and detours are needed on or affecting State highways, a TMP or construction TIS may be required for approval by Caltrans prior to construction. Traffic Management Plans must be prepared in accordance with Caltrans' *Manual on Uniform Traffic Control Devices.* Further information is available for download at the following web address: http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/pdf/camutcd2012/Part6.pdf.

Please ensure that such plans are also prepared in accordance with the transportation management plan requirements of the corresponding jurisdictions. For further TMP assistance, please contact the Office of Traffic Management Plans at (510) 286-4647.

Transportation Permit
Project work that requires movement of oversized or excessive load vehicles on State roadways requires a transportation permit that is issued by Caltrans. To apply, a completed transportation permit application with the determined specific route(s) for the shipper to follow from origin to destination must be submitted to: David Salladay, District Office Chief, Office of Permits, California Department of Transportation, District 4, P.O. Box 23660, Oakland, CA 94623-0660. See the following website for more information: http://www.dot.ca.gov/hq/traffops/permits.

Should you have any questions regarding this letter, please contact Brian Brandert of my staff at (510) 286-5505 or brian.brandert@dot.ca.gov.

Sincerely,



ERIK ALM, AICP
District Branch Chief
Local Development - Intergovernmental Review

c: Scott Morgan, State Clearinghouse

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

May 7, 2014

Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Re: Almaden Lake Project, Notice of Preparation of an Environmental Impact Report

Dear Mr. Martin:

Thank you for the opportunity to provide comments on the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the Almaden Lake Project. The Santa Clara Valley Water District (District) proposes to modify Almaden Lake to reduce the amount of methylmercury produced in the lake and improve conditions for anadromous fish. This project has also been proposed by the District as a conservation measure in the February 2014 draft Three Creeks Habitat Conservation Plan (Guadalupe River Channel Enhancement, Conservation Measure 89-GMS-MEAS).

NOAA's National Marine Fisheries Service (NMFS) has reviewed the NOP, and we support the project's stated objectives: (1) reduce mercury in fish and production of methylmercury; (2) reduce thermal barrier to anadromous fish migration; (3) remove entrainment and impacts from predatory species to anadromous fish; and (4) minimize impacts to recreational features. Methylmercury and degraded habitat conditions for anadromous fish are significant issues at this location, and remediation of these problems will support the restoration of threatened Central California Coast steelhead (*Oncorhynchus mykiss*) in the Guadalupe River watershed.

The District presents on its website[1] five project alternatives for remediation of Almaden Lake and all five alternatives limit the footprint of the project to the ponded water body upstream of Coleman Road (approximately 1,750 linear feet of Alamitos Creek). Contiguous with this 32-acre portion of Almaden Lake is an additional 10-acre ponded water body extending from Coleman Road downstream to the District's Alamitos Diversion Dam/Drop Structure (Alamitos Diversion Dam). This additional channel length of approximately 1,700 feet also contains severely degraded habitat conditions for anadromous fish and most of the solutions to the 32-acre footprint of Almaden Lake would also be applicable to this downstream portion of Alamitos Creek. NMFS recommends the footprint of the Almaden Lake Project be extended to include this contiguous ponded area between Coleman Road and the Alamitos Diversion Dam. The following comments pertain to the merits of expanding the scope of the Almaden Lake Project to include this downstream reach of Alamitos Creek.

[1] http://www.valleywater.org/Mercury/AlmadenLake.aspx

As stated in the NOP, Almaden Lake has little vegetation on its banks. The open water conditions extending upstream from the Alamitos Diversion Dam to the upstream end of Almaden Lake provide habitat for piscivorous birds and non-native piscivorous fish. Riffles, runs, and other fast water riverine habitat features that support native anadromous salmonids are absent in this 3,450-foot long (0.65 mile) reach of Alamitos Creek. Water temperatures in Alamitos Creek warm significantly as creek flows pass through this long and unshaded reach of open water.[2] By setting the project's downstream boundary at Coleman Road, the existing project scope presented in the NOP is limited to approximately half the channel distance of this problem area. This truncated distance also prevents the project from addressing significant habitat problems for anadromous salmonids in this reach. By extending the project area to the Alamitos Diversion Dam, the amount of stream habitat restoration in Alamitos Creek could double to 3,450 linear feet of channel and habitat improvements by the project could replace long, open, and low velocity pools with productive riffle-pool complexes and instream habitat complexity features.

As the project is currently proposed, Alamitos Diversion Dam is not within the project area, but its operation significantly constrains the ability of the project to restore fish habitat within Almaden Lake. As stated in the NOP, the installation of flashboards at the Alamitos Diversion Dam raises the water surface elevation in Almaden Lake by approximately 5 feet. Thus, any instream habitat features designed for steelhead and Chinook salmon in the Almaden Lake reach would be inundated by several feet of water when the District's water diversion dam is operated. Juvenile steelhead rearing in streams of Santa Clara County are typically found in fast water areas of runs, riffles, and the heads of pools, where drift feeding is possible. At these sites, juveniles can exploit the higher rate of prey delivery required to meet energy demands associated with higher water temperatures. With the continued operation of the Alamitos Diversion Dam, the upstream 0.65 mile reach of Alamitos Creek which includes Almaden Lake will not provide fast-water feeding habitat during the summer/fall months and cannot provide suitable spawning habitat during the winter.

As described in the NOP, the modification of Almaden Lake requires a flow through system that would be connected to the Alamitos Percolation Pond. This project creates new opportunities to draw water from the restored Alamitos Creek to the District's off-channel percolation ponds. As exemplified by the Bureau of Reclamation's 2010 Red Bluff Fish Passage Improvement Project on the Upper Sacramento River, on-channel diversion dams are being replaced with state-of-the-art pumping plants and fish screens. If the Alamitos Diversion Dam was replaced with an alternative water diversion system, the full 0.65 mile length of Alamitos Creek extending from the top of Almaden Lake to the existing diversion dam could be restored to healthy riverine habitat conditions which support the migration, spawning, and rearing of anadromous salmonids; better supporting project objectives 2 and 3.

Additional benefits associated with the creation of a new water diversion system for the District's percolation ponds are numerous including: (1) the possibility of replacing the existing Alamitos fish ladder with a natural rock pool/weir fish passage structure and elimination of the fish

[2] Simulated Water Temperature Effects of Bypassing Almaden Lake, Prepared for U.S. Army Corps of Engineers by Jones & Stokes, July 2004.

entrapment problem on the downstream side of the Alamitos Diversion Dam; (2) sediment transport at the mouth of Guadalupe Creek would be improved which would reduce the District's maintenance requirements for flood flow conveyance under the Almaden Expressway bridge and fish passage to Guadalupe Creek; (3) would eliminate the need for the District's 2015-2019 Capitol Improvement Project, Alamitos Diversion Dam Improvements with an estimate cost of $3.27 million; and (4) further reductions in the production of methylmercury .

Without inclusion of the channel reach between Coleman Road and the Alamitos Diversion Dam, the Almaden Lake Project cannot fully achieve its objectives of removing entrainment and impacts from predatory species to anadromous fish, and reducing thermal impacts. The 1,700 linear feet of ponded area below Coleman Road will continue to subject anadromous salmonids to ponded water conditions and the diversion dam will continue to impede salmonid passage. NMFS strongly encourages the District to develop alternatives for the EIR that include this additional length of Alamitos Creek and assess the ability of the expanded footprint to accomplish the project's objectives.

Please direct questions regarding this letter to Gary Stern, North-Central Coast Office in Santa Rosa, California at (707) 575-6060 or gary.stern@noaa.gov.

Sincerely,

for Gary Stern

Irma Lagomarsino
Assistant Regional Administrator
California Coastal Area Office

cc: Tami Schane, CDFW, Yountville, CA
Margarete Beth, Regional Water Board, Oakland, CA
Lisa Mangione, USACE, San Francisco, CA
Luisa Valiela, USEPA, San Francisco, CA
Joseph Terry, USFWS, Sacramento, CA
Debra Caldon, SCVWD, San Jose, CA

Santa Clara Valley
Audubon Society

May 1st, 2014 *via email*

Mr. Michael Martin
Santa Clara valley Water District
michaelmartin@valleywater.org

Scoping comments: Almaden Lake Project

Dear Mr. Martin,

Santa Clara Valley Audubon Society (SCVAS) thanks you for the opportunity to provide scoping comments for the Almaden Lake Project (Project). SCVAS has over 3500 members in Santa Clara County who share a passion for birds and wildlife, and the habitats and ecosystems that support them. We have engaged in the planning process that led to the selection of preferred alternatives, and we expect to continue our engagement as the Project moves through the environmental review process.

Comment 1: Use of Herbicides, Insecticides and Rodenticides- Please analyze the potential of herbicides, insecticides and rodenticides to impact habitats during the construction and the projected lifespan of the project. Please list all the biocides that may be used on the Project site. Please analyze potential for direct and secondary poisoning of birds and wildlife during construction and operations. Please consider disallowing use of rodent baits and other chemical rodenticides onsite.

Comment 2. Great Egrets, Snowy Egrets, Green Herons and Black-Capped Night Herons nest on the Almaden Island. Green Herons also nest in vegetation on the East side of the lake. Please describe and analyze impacts to nesting egrets and heron species at Almaden Lake.

Comment 3: The NOP states that Western Pond Turtles should not be impacted since "open water will still be available". Western pond turtles require both aquatic and terrestrial habitat. Please consider impacts to upland nesting habitat.

Comment 4: It is our preference that the paths/trails/access roads on the levees crossing the lake remain unpaved. This would allow birders and other slow-moving recreationists to use the levees without conflicts with fast moving bikes. If plans exist to pave these levees, please consider conflicts and describe impacts to our sport of bird watching.

Please keep us informed on any further opportunity for public review and input on this project.

22221 McClellan Road, Cupertino, CA 95014 Phone: (408) 252-3748 * Fax: (408) 252-2850
email: scvas@scvas.org * www.scvas.org

Please call us at (650) 868 2114 if we can be of help,

Thank you,



Shani Kleinhaus, Environmental Advocate

22221 McClellan Road, Cupertino, CA 95014 Phone: (408) 252-3748 * Fax: (408) 252-2850
email: scvas@scvas.org * www.scvas.org

May 2, 2014

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

Attn: Michael Martin
Email: Michaelmartin@valleywater.org

Subject: Almaden Lake, Notice of Preparation of an Environmental Impact Report

Dear Mr. Martin

Regional Water Board staff appreciates the opportunity to comment on the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the Almaden Lake Project.

The Santa Clara Valley Water District (District) proposes to modify Almaden Lake to reduce mercury and production of methymercury in the lake, reduce thermal barrier to anadromous fish, and remove fish entrainment. Alamitos Creek flows through Almaden Lake and downstream to Guadalupe River. Almaden Lake is located within the City of San Jose's Almaden Lake Park. The Project would include isolating Alamitos Creek within a 210-foot wide channel separated from the remaining lake; re-contouring the bottom of the lake and capping the mercury-laden sediment under five feet of clean sediment; expanding the park on the west of the lake two acres into the existing lake, restoring the embankment between Almaden Lake and Alamitos Creek; expanding the existing island, creating a second island; and installing riparian vegetation along the banks of the creek and islands.

Water Board staff has reviewed the NOP and provide the following comments.

1. Both a Clean Water Act (CWA) Section 401 water quality certification and a CWA Section 404 Permit from the U.S. Army Corps of Engineers (USACE) will be necessary for fill impacts to waters of the U.S. Additionally, the District may need to file a Report of Waste Discharge if the Project may impact waters of the State, even if such waters have been excluded from federal jurisdiction (e.g., isolated wetlands, ephemeral streams without a significant nexus, or stream banks above the ordinary high water mark).
2. The Regional Water Board adopted U.S. Environmental Protection Agency's (USEPA) Section 404(b)(1), "Guidelines for Specification of Disposal Sites for Dredge or Fill Material," dated December 24, 1980, in its Basin Plan for

determining the circumstance under which filling of wetlands, streams or other waters of the State may be permitted. The 404(b)(1) Guidelines prohibit all discharges of fill material into regulated waters of the U.S., unless a discharge, as proposed, constitutes the least environmentally damaging practicable alternative (LEDPA) that will achieve the basic project purpose.

The Project includes a significant amount of fill to expand the park into the lake, isolate the channel, and create a second island. The Guidelines sequence the order in which proposals should be approached: 1) avoid—avoid impacts to waters; 2) minimize—modify project to minimize impacts to waters; and, 3) mitigate—once impacts have been fully minimized, compensate for unavoidable impacts to waters. When it is not possible to avoid impacts to water bodies, disturbance should be minimized. Compensatory mitigation for lost water body acreage and functions through restoration or creation should only be considered after disturbance has been minimized. Where impacts cannot be avoided, the creation of adequate mitigation habitat to compensate for the loss of water body acreage, functions, and values must be provided.

The District should be aware that, unlike an analysis of alternatives under CEQA, the 404(b)(1) Guidelines do not allow for the use compensatory mitigation[1] as a method of reducing environmental impacts in the evaluation of LEDPA. The 1990 memorandum of agreement between the USEPA and the Department of the Army states:

Compensatory mitigation may not be used as a method to reduce environmental impacts in the evaluation of the least environmentally damaging practicable alternatives for the purposes of requirements under Section 230.10(a) (USEPA 1990).[2]

Compensatory mitigation cannot be used as a strategy to arrive at a preferred alternative and should only be used after all avoidance and minimization measures have been exhausted. The District will need to exhaust all impact avoidance and minimization measures before relying on compensatory mitigation to determine LEDPA when applying for a CWA Section 401 water quality certification

3. The Project includes isolating Alamitos Creek within a 210-foot wide channel separate from Almaden Lake. This may change stream flow and sedimentation processes in these areas and immediately downstream. The EIR should include hydrologic and sediment transport studies to determine if the new channel design is appropriate to pass the sediment load and stream flow and will not result in

[1] "Compensatory mitigation" refers to the replacement of stream and wetland area, functions, and beneficial uses through creation or restoration as part of a permitting action for a CWA Section 401 water quality certification or waste discharge requirements.
[2] USEPA. 1990. Memorandum of agreement between the environmental protection agency and the department of the army concerning the determination of mitigation under the clean water act section 404(b)(1) guidelines. Reprinted in 55 Federal Register 9210 (March 10, 1990).

any geomorphic changes to channel shape or slope upstream and downstream of the Project site or require frequent maintenance to remove sediment deposited within the channel. The hydrogeomorphic analysis should demonstrate that the Project design will not cause channel scour or sedimentation downstream and/or create channel slope instabilities.

4. Bank Stabilization: If the Project includes rock slope protection and concrete lining of the channel bed and bank, the EIR should demonstrate, supported by engineering analysis, that bioengineering methods are technically infeasible and that hardscape methods are necessary based on the Project site sheer stresses. The USACE has developed tables of allowable shear stresses which relate the capacity of channel conditions assisted with different soil bioengineering systems to offer effective resistance to these shear stresses.[3] This USACE reference (Fischenich 2001) can provide guidance to determine the most appropriate bank stabilization methods based on site-specific conditions.

   The EIR should include more justification on the need for bank repair at erosion sites. The analysis of erosion sites in the EIR should consider factors that contribute to erosion and evaluate watershed processes as well as the influences acting on a smaller, more localized reach level which are affecting erosion processes at individual project sites.

   The Regional Water Board does not consider arresting erosion processes through placement of hardened stream bank materials a beneficial impact but rather an impact to waters of the State. The EIR should weigh all aquatic resource functions together, such that reduction in erosion potential is considered in tandem with direct loss of aquatic habitat from stream bank rock slope protection and concrete lining of the channel bed and bank

5. Maintenance Roads: The EIR should include a discussion of the adverse impacts to water quality if the maintenance road will be paved (e.g., polycyclic aromatic hydrocarbons) and discuss project alternatives that would result in fewer impacts to waters of the State, such as topping the maintenance roads with gravel instead of asphalt where possible or routing the runoff through vegetated areas.

6. Instream Erosion: The EIR should include an analysis of how changes in stream flow velocities may result in erosion, sediment deposition, and changes in channel form in Almaden Lake, Alamitos Creek and Guadalupe River. If hydrologic and geomorphic studies indicate adverse impacts to biological resources from the Project, the EIR should include appropriate BMPs to mitigate such impacts. The EIR should also include an analysis of how the Project may impact upstream fish migration and, as necessary, incorporate mitigation measures such as modifying box culvert and bridge replacement design to maintain upstream fish migration.

[3] Fischenich, J.C. 2001. Stability thresholds for stream restoration materials. EMRRP Technical Notes Collection. *ERDC TN-EMRRP-SR-29*. U.S. Army Engineer Research and Development Center, Vicksburg, MS. 10 pp.

7. Percolation Pond and Water Diversion: The Project will draw water from the creek to the lake and overflow will enter the Alamitos Percolation Pond. The EIR should discuss any existing water rights for the Percolation Pond, Almaden Lake, and Alamitos Creek and if any revisions to the existing or new water rights will be required.
8. Staging areas: The EIR should identify the establishment of buffers around staging areas as a mitigation measures. To avoid water quality and habitat impacts from Project staging areas, we recommend establishing a buffer area of 100 feet around all waters of the State in the Project area. This is consistent with the recommendations for construction site BMPs from the California Department of Transportation (2003[4], p. 71) and the California Stormwater Quality Association (2009[5], p. 111).
    - The buffer width needed to maintain water quality ranges from 5 to 30 m (16 to 98 ft)…Buffer widths for habitat concerns are typically wider than those recommended for water quality concerns (30 to 500 m [98 to 1,640 ft]).
    - The buffer width needed to maintain water quality ranges from 15 to 100 ft…Buffer widths for habitat concerns are typically wider than those recommended for water quality concerns (100 to 1500 ft).

Please feel free to contact me at (510) 622-2338 or by email at margarete.beth@waterboards.ca.gov, if you have any questions.

Sincerely,

Margarete Beth
Environmental Specialist

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[4] California Department of Transportation. 2003. Storm Water Quality Handbooks: Construction Site Best Management Practices (BMPs) Manual.
[5] California Stormwater Quality Association. 2009. Stormwater Best Management Practice Handbook Portal: Construction.

Appendix B
Air Quality and Greenhouse Gas Emissions

ESA

B.1 CalEEMod Emissions Output Summaries

ESA

B.1 - CalEEMod Emissions Output Summaries

Unmitigated CalEEMod Criteria Pollutant Construction Emissions

Source and Year	ROG	NO_x	PM_{10}	$PM_{2.5}$
Equipment and Vehicles - 2021	0.47	4.87	0.18	0.17
Equipment and Vehicles - 2022	1.13	17.08	0.34	0.32
Equipment and Vehicles - 2023	0.10	0.95	0.03	0.03
Total Tons	1.70	22.91	0.56	0.53
Total Pounds	3,403.80	45,810.20	1,120.60	1,057.80
Average Daily Emissions*	6.73	90.53	2.21	2.09

*Assumes construction of the project would occur over 506 workdays. See CalEEMod output sheets

Unmitigated Total Criteria Pollutant Construction Emissions

Source and Year	ROG	NO_x	PM_{10}	$PM_{2.5}$
Average Daily Emissions*	6.73	90.53	2.21	2.09
Railroad Hauling	0.14	2.84	0.06	0.06
Total	6.87	93.37	2.28	2.15

*Assumes construction of the project would occur over 506 workdays.

Mitigated CalEEMod Criteria Pollutant Construction Emissions

Year	ROG	NO_x	PM_{10}	$PM_{2.5}$
Equipment and Vehicles - 2021	0.12	0.83	0.02	0.02
Equipment and Vehicles - 2022	0.49	10.11	0.05	0.05
Equipment and Vehicles - 2023	0.03	0.29	0.00	0.00
Total Tons	0.63	11.22	0.07	0.07
Total Pounds	1,264.00	22,445.20	139.32	136.28
Average Daily Emissions*	2.50	44.36	0.28	0.27

*Assumes construction of the project would occur over 506 workdays.

Mitigated Total Criteria Pollutant Construction Emissions

Source and Year	ROG	NO_x	PM_{10}	$PM_{2.5}$
Average Daily Emissions*	2.50	44.36	0.28	0.27
Railroad Hauling	0.14	2.84	0.06	0.06
Total	2.64	47.20	0.34	0.33

*Assumes construction of the project would occur over 506 workdays.

CalEEMod Greenhouse Gas Construction Emissions

Year	CO_2e
Equipment and Vehicles - 2021	839.77
Equipment and Vehicles - 2022	4,189.73
Equipment and Vehicles - 2023	251.52
Equipment and Vehicles - Total	5,281.01
Rail Line Haul	667.72
Total Metric Tons	5,948.73
Amortized over 30 years	198.29

Unmitigated Diesel Particulate Matter Emissions for HRA

Project Phase		Source	PM_{10}	$PM_{2.5}$
Creek Diversion and Lake Draining (includes cofferdam installation)	2021	off-road	0.0163	0.0157
		EMFAC	0	0
		subtotal	0.0163	0.0157
Levee footprint, reinforcement of underlying soil by soil cement columns (Lake bed drying)	2021	off-road	0.0732	0.068
		EMFAC	0.00002	0.00002
		subtotal	0.07322	0.06802
	2022	off-road	0.0123	0.0114
		EMFAC	0	0
		subtotal	0.0123	0.0114
Working Surface/Vegetation & Debris Removal	2021	off-road	0.0565	0.052
		EMFAC	0	0
		subtotal	0.0565	0.052
	2022	off-road	0.1004	0.0923
		EMFAC	0.00001	0.00001
		subtotal	0.10041	0.09231
Lake and Levee Foundation Area with 2.5' clay cap (includes maintenance access road fill)	2021	off-road	0.004	0.0037
		EMFAC	0.00006	0.00006
		subtotal	0.00406	0.00376
	2022	off-road	0.0113	0.0105
		EMFAC	0.00017	0.00016
		subtotal	0.01147	0.01066
Expanded and New Islands	2022	off-road	0.025	0.0231
		EMFAC	0.00014	0.00014
		subtotal	0.02514	0.02324
Transfer Pipeline from Almaden Valley PL	2022	off-road	0.0183	0.0168
		EMFAC	0	0
		subtotal	0.0183	0.0168
Lake Area with 2.5’ clay cap	2022	off-road	0.0171	0.0158
		EMFAC	0.00053	0.00051
		subtotal	0.01763	0.01631
Alamitos Restored Channel Area with 2.5’ clay cap	2022	off-road	0.0242	0.0223
		EMFAC	0.00074	0.00071
		subtotal	0.02494	0.02301
Transfer Pipeline to Los Alamitos Perc. Pond	2022	off-road	0.0183	0.0168
		EMFAC	0.00004	0.00004
		subtotal	0.01834	0.01684
New Park Area	2022	off-road	0.0151	0.014
		EMFAC	0.00014	0.00013
		subtotal	0.01524	0.01413
	2023	off-road	0.00554	0.00512
		EMFAC	0.00003	0.00003
		subtotal	0.00557	0.00515
Alamitos Creek West Bank Shore Grading	2022	off-road	0.00113	0.00104
		EMFAC	0.00003	0.00003
		subtotal	0.00116	0.00107
Revegetation and Landscaping	2022	off-road	0.00023	0.00022
		EMFAC	0	0
		subtotal	0.00023	0.00022
Revegetation and Landscaping	2023	off-road	0.00617	0.00603
		EMFAC	0	0
		subtotal	0.00617	0.00603
Dewatering (occurs throughout construction as a conservative assumption)	2021	off-road	0.0324	0.0324
		EMFAC	0	0
		subtotal	0.0324	0.0324
	2022	off-road	0.0723	0.0723
		EMFAC	0	0
		subtotal	0.0723	0.0723
	2023	off-road	0.0224	0.0224
		EMFAC	0	0
		subtotal	0.0224	0.0224
Total Emissions (tons)			0.53408	0.50375
Total Emissions (pounds)			1068.16	1007.5

Construction would be from June 1, 2021 to May 10, 2023, five days a week.
"off-road" emissions represent on-site emissions associated with off-road construction equipment.
"EMFAC" emissions represent on-ste emissions associated with haul truck and vendor trips.
For the purposes of the HRA analysis, each trip is 0.2 miles, representing the vehicle emissions that would occur at the site.

Mitigated Diesel Particulate Matter Emissions for HRA

Project Phase		Source	PM_{10}	$PM_{2.5}$
Creek Diversion and Lake Draining (includes cofferdam installation)	2021	off-road	0.00399	0.00379
		EMFAC	0	0
		subtotal	0.00399	0.00379
Levee footprint, reinforcement of underlying soil by soil cement columns (Lake bed drying)	2021	off-road	0.00501	0.00501
		EMFAC	0.00002	0.00002
		subtotal	0.00503	0.00503
	2022	off-road	0.00103	0.00103
		EMFAC	0	0
		subtotal	0.00103	0.00103
Working Surface/Vegetation & Debris Removal	2021	off-road	0.0036	0.0036
		EMFAC	0	0
		subtotal	0.0036	0.0036
	2022	off-road	0.00695	0.00695
		EMFAC	0.00001	0.00001
		subtotal	0.00696	0.00696
Lake and Levee Foundation Area with 2.5' clay cap (includes maintenance access road fill)	2021	off-road	0.00032	0.00032
		EMFAC	0.00006	0.00006
		subtotal	0.00038	0.00038
	2022	off-road	0.0011	0.0011
		EMFAC	0.00017	0.00016
		subtotal	0.00127	0.00126
Expanded and New Islands	2022	off-road	0.00243	0.00243
		EMFAC	0.00014	0.00014
		subtotal	0.00257	0.00257
Transfer Pipeline from Almaden Valley PL	2022	off-road	0.00148	0.00148
		EMFAC	0	0
		subtotal	0.00148	0.00148
Lake Area with 2.5’ clay cap	2022	off-road	0.00167	0.00167
		EMFAC	0.00053	0.00051
		subtotal	0.0022	0.00218
Alamitos Restored Channel Area with 2.5’ clay cap	2022	off-road	0.00243	0.00243
		EMFAC	0.00074	0.00071
		subtotal	0.00317	0.00314
Transfer Pipeline to Los Alamitos Perc. Pond	2022	off-road	0.00148	0.00148
		EMFAC	0.00004	0.00004
		subtotal	0.00152	0.00152
New Park Area	2022	off-road	0.00147	0.00147
		EMFAC	0.00014	0.00013
		subtotal	0.00161	0.0016
	2023	off-road	0.0006	0.0006
		EMFAC	0.00003	0.00003
		subtotal	0.00063	0.00063
Alamitos Creek West Bank Shore Grading	2022	off-road	0.00011	0.00011
		EMFAC	0.00003	0.00003
		subtotal	0.00014	0.00014
Revegetation and Landscaping	2022	off-road	0.00002	0.00002
		EMFAC	0	0
		subtotal	0.00002	0.00002
	2023	off-road	0.0005	0.0005
		EMFAC	0	0
		subtotal	0.0005	0.0005
Dewatering (occurs throughout construction as a conservative assumption)	2021	off-road	0.0016	0.0016
		EMFAC	0	0
		subtotal	0.0016	0.0016
	2022	off-road	0.00407	0.00407
		EMFAC	0	0
		subtotal	0.00407	0.00407
	2023	off-road	0.00146	0.00146
		EMFAC	0	0
		subtotal	0.00146	0.00146
Total Emissions (tons)			0.04323	0.04296
Total Emissions (pounds)			86.46	85.92

Construction would be from June 1, 2021 to May 10, 2023, five days a week.

"off-road" emissions represent on-site emissions associated with off-road construction equipment.

"EMFAC" emissions represent on-ste emissions associated with haul truck and vendor trips.

For the purposes of the HRA analysis, each trip length is 0.2 miles, representing the vehicle emissions that would occur at the site.

B.2 Construction Truck and Automobile Trip Assumptions



B.2 - Construction Truck and Automobile Trip Assumptions

Construction Schedule and Detailed Assumptions

Phases	Number of Workers (Max.)	Start (month/date/ year)	Finish (month/date/ year)	Duration (Work Days)	Duration (Days per week)	Cut Volume (cubic yards)	20% cut volume for off haul (yd^3)	Fill Volume (cubic yards)	Fill Requiring hauling to the site (yd3)	# of Worker Trips/Day	Worker Trip Distance (mi)	Total # of Haul Trips to Transport Cut Volumes	Total # of Haul Trips/Day to Transport Cut Volumes	Cut Hauling Trip Length Distance (1st leg) 53 mi to Port of Oakland Rail	Cut Hauling Rail Trip Length Distance (2nd leg) Port of Oakland Rail to edge of BAAQMD jurisdiction -	Cut Hauling Rail Trip Length Distance (3rd leg) outside BAAQMD jurisdiction to SLC - 687 mi	Total # of Haul Trips to Transport Fill Volumes	Total # of Haul Trips to Transport Cut and Fill Volumes	Total # of Haul Trips/Day to Transport Fill Volumes	Fill Hauling Trip Length Distance (mi)	Total # of Vendor Trips/Day to Deliver Pipes, Sheet Piles, cement, etc.	Total # of Vendor Trips/Day to Deliver Pipes, Sheet Piles, cement, etc. (ROUNDED UP TO NEAREST EVEN)	Vendor Trip Length Distance (mi)	Grand Total Vendor and Haul Trips/day
Creek Diversion and Lake Draining (includes cofferdam installation)	8	6/1/2021	8/11/2021	52	5	-	-		-	20	12.4	-	0.00								3	4	7.3	4
Levee footprint, reinforcement of underlying soil by soil cement columns (Lake bed drying)	8	8/12/2021	1/31/2022	123	5	-	-		-	20	12.4	-	0.00	53	44	687	-		-		6	10	7.3	10
Working Surface/Vegetation & Debris Removal	8	8/12/2021	10/4/2022	299	5	-	-		-	20	12.4	-	0.00	53	44	687	-		-		2	2	7.3	2
Lake and Levee Foundation Area with 2.5' clay cap (includes maintenance access road fill)	8	12/4/2021	4/6/2022	88	5	120	24	75,455	75,359	20	12.4	3.00	0.03	53	44	687	9,419.88	9,422.88	107.04	18.53	2	2	7.3	109
Expanded and New Islands	8	4/6/2022	7/19/2022	75	5			50,000	50,000	20		-	0.00				6,250.00	6,250.00	83.33	18.53	2	2	7.3	85
Transfer Pipeline from Almaden Valley PL	8	4/6/2022	7/26/2022	80	5	1,665	333	1,521	189	20		41.63					23.63	65.25	0.30	18.53	2	2	7.3	2
Lake Area with 2.5' clay cap	8	4/6/2022	8/26/2022	103	5	91,639	18,328	241,509	168,198	20	12.4	2,290.98	22.24	53	44	687	21,024.73	23,315.70	204.12	18.53	2	2	7.3	228
Alamitos Restored Channel Area with 2.5' clay cap	8	6/1/2022	12/27/2022	150	5	1,556	311	261,283	260,038	20	12.4	38.90	0.26	53	44	687	32,504.78	32,543.68	216.70	18.53	2	2	7.3	219
Transfer Pipeline to Los Alamitos Perc. Pond	5	6/25/2022	10/14/2022	80	5	45,884	9,177	41,174	4,467	2	12.4	1,147.10	14.34	53	44	687	558.35	1,705.45	6.98	18.53	2	2	7.3	23
New Park Area	5	8/26/2022	2/21/2023	128	5	511	102	68,565	68,156	14	12.4	12.78	0.10	53	44	687	8,519.53	8,532.30	66.56	18.53	2	2	7.3	69
Alamitos Creek West Bank Shore Grading	8	10/22/2019	11/1/2022	7	5	203	41	9,664	9,502	20	12.4	5.08	0.73	53	44	687	1,187.70	1,192.78	169.67	18.53	2	2	7.3	172
Revegetation and Landscaping	8	12/28/2022	5/9/2023	95	5		0	0	-	20	12.4	-	0.00	53	44	687	-		-		2	2	7.3	2
Dewatering (occurs throughout construction as a conservative assumption)	0	8/12/2021	5/10/2023	455	5	0	0	0	-			-	0.00				-				0			
ASSUME 80% of cut would be reused on site.						141,578	28,316	749,171	635,909			3,539.45	37.70				79,489	83,028					Maximum Daily Trips	738.01
									Maximum Day	120													Maximum Hourly	82.0
																							Maximum Hourly Trips (7 a.m. to 7 p.m.)	61.5

Weighted Average for Cut and Fill Haul Trips Need for CalEEMod Inputs

Trip Types	Total # Trips	Hauling Distance	Total Weighted Cut/Fill Hauling Distance	Grand Total	Total hauling miles travelled
cut	3,539	53	18.53	83,028	1,538,509
fill	79,489	17.00			

Haul truck capacity (yd^3)	16
# of trips per roundtrip	2

Worker trips per worker*	2.5
# of total workdays if construction ends on last day of revegetation and landscapaign	506

*To account for additional travel for lunch.

Sheet piles for cofferdam

Length of each sheet pile section (ft)	50
Width of each sheet pile section (ft)	25
Area of sheet pile (sq feet)	1250
# of sheet pile sections needed	68
Sheet pile total area (SF)	85000
truck capacity (yd^3)	16
Sheet pile weight (lb/sf)	31.8
Truck capacity (tons)	20
# of trucks needed	**68**

Aggregate Needed for Maintenance Ramps

Volume of aggregate (yd^3)	1600
truck capacity (yd^3)	16
# of truckloads needed	**100**

Sand Needed for Working Platform for Levee Construction/Soil Cement Installation

Volume of sand (yd^3)	4000
truck capacity (yd^3)	16
# of truckloads needed	**250**

Cement needed for soil cement

volume soil cement needed (yd3)	-	
volume soil cement needed (ft3)	-	
weight of cement needed for 1 ft3 soil cement	16	lbs
weight soil cement needed (lbs)	-	
weight soil cement needed (tons)	-	
Truckloads	**-**	

Notes:
1 Make: Hammer & Steel, Model: Telescopic Mast Mobilram, TM 18/22D
Source: http://www.hammersteel.com/cmss_files/attachmentlibrary/Brochures/ABI/2009ABIRevisions3-7-09.pdf
2 Make: Hydraulic Power Systems, Inc., Model: 800 Exciter
Source: http://hpsiqualitypiledrivers.com/vibratory-hammers/caisson-hammers/model-800/
3 Make: Arbrux
Source: http://www.arbrux.com/products/pond-aerators/industrial-aerators/

B.3 Operational GHG Emissions – Electricity Consumption

ESA

REVISED APPENDIX B.3 - Operational GHG Emissions - Electricity Consumption

Source	Quantity	Fuel Type	Horsepower (HP) or kW rating	Annual Throughput Data (kWh, gallons, therms, etc.)	Time of Day Source/Equipment will Operate (Continuous, 9am – 5pm)
Electric Pump station	3	Electric, 40 HP*	705,492	kWh/yr	Continuous, 24 hrs/day, 365 days/year
1 HP equals	745.7	watts		Assumed pump efficiency	90%
1kW equals	1000	watts		Capacity factor	100% (constantly running)
1 year equals	8760	hours			

* assumes pump constantly running at max power, a conservative overestimate

Baseline Indirect Emissions from Electricity Consumption

GHGs from Electricity Consumption					
GHG	Emission Factor (lb/kWh)	Consumption kWhr	metric tons	CO_2e* (metric tons)	kWhr/day
CO_2	0.29000	705,492	92.80	92.80	1932.8544
CH_4	0.000031	705,492	0.01	0.25	
N_20	0.000006	705,492	0.00	0.54	
			Total =	93.59	

Notes: The emission factor for CO_2 was obtained from PG&E, 2015. Emission factors for CH_4 and N_2O are from TCR, 2016.

*Global Warming Potential for CH_4 = 25; GWP for N_2O = 298 (CARB, 2016).

Pacific Gas and Electric Company (PG&E), 2015. Greenhouse Gas Emission Factors: Guidance for PG&E Customers, November 2015.
The Climate Registry (TCR), 2016. The Climate Registry 2016 Default Emission Factors, April 19, 2016.

B.4 Construction Locomotive Emissions

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B.4 - Construction Locomotive Emissions

Parameter	Value	Units
density of wet soil[1]	2	tonnes/m^3
total volume of cut soil from Almaden Lake	28,316	yd^3
total mass of cut soil	43,562	tonnes
total mass of cut soil	47,918.71	tons
Maximum Freight Weight	106	tons/car
Weight of Empty Tank Car	37	tons/car
Total railcars needed	452	cars
Total weight of all empty cars needed	16,726.34	tons
Total weight of all cars and soil	64,645	tons
One-way Track Distance from Port of Oakland to edge of BAAQMD jurisdiction[3]	44	miles
One-way Track Distance from Port of Oakland to Salt Lake City[3]	731	miles

Maximum Freight Weight is gross wieght limit (286,000 pounds) minus empty car weight.

One-way Hauling Distance to Kettleman City (mi)	166
One-way Hauling Distance to Salt Lake City (mi)	746
Number of times farther	4.5

Fuel Consumption Related to Track Portion for Criteria Pollutants Emitted Within BAAQMD Jurisdiction

total ton-miles for full cars (outbound)	2,844,382.16	ton-miles
total ton-miles for empty cars (outbound)	735,959.02	ton-miles
Fuel Consumption Index[2]	928	(gross ton-miles/gal)
total gallons for full cars (outbound)	3,065.07	gallons
total gallons for empty cars (inbound)	793	gallons
Total gallons for entire rail operation	3,858	gallons

Fuel Consumption Related to Entire Track Portion for All Greenhouse Gas Emissions Emitted

total ton-miles for full cars (outbound)	47,255,530.86	ton-miles
total ton-miles for empty cars (outbound)	12,226,955.54	ton-miles
Fuel Consumption Index[2]	918	(gross ton-miles/gal)
total gallons for full cars (outbound)	51,477	gallons
total gallons for empty cars (inbound)	13,319	gallons
Total gallons for entire rail operation	64,796	gallons

Conversion Factors

m^3 per yd^3	1.3
tons per tonne	1.1
grams to pounds	0.002205
grams to tonnes	1.00E-06

Year 2021 Locomotive Emission Factors[2]

	Emission Factor (g/gal fuel)					
Operation Type	CO	HC[4]	NO_x	PM_{10}	$PM_{2.5}$	CO_2e
Locomotive Emissions	27.4	8.50	169	3.83	3.83	10,305

Total Locomotive Emissions

grams					
CO	HC[4]	NO_x	PM_{10}	$PM_{2.5}$	CO_2e
105,712.66	32,794	652,023.34	14,789	14,789	667,720,067.90

tons/project					tonnes/project
CO	HC[4]	NO_x	PM_{10}	$PM_{2.5}$	CO_2e
0.12	0.04	0.72	0.02	0.02	667.72

pounds/day					tonnes
CO	HC[4]	NO_x	PM_{10}	$PM_{2.5}$	CO_2e
0.46	0.14	2.84	0.06	0.06	668

total days of construction	506

[1] https://answers.yahoo.com/question/index?qid=20090727070001AACuMJl

[2] Emission factors for PM, HC, and NOx are from USEPA, 2009, and are averages for large line, large switch, and small railroads for calendar year 2021.
Emission factor for CO is from USEPA, 1997, average locomotive emissions for 2021.
Emission factor for CO2e and fuel consumption index are from Yorke, 2018.
USEPA, 2009, Emission Factors for Locomotives (https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100500B.pdf)
USEPA, 1997, Emission Factors for Locomotives; Bergin et. El. (https://www3.epa.gov/ttnchie1/conference/ei20/session8/mbergin.pdf); ESA, 2013. Locomotive Input Data from Crude by Rail Project
Yorke, 2018. Phillips 66 Propane Recovery Project Rail Transport Emissions Update and HRA

[3] measured using Google Maps

[4] Used interchangeably with ROG for a conservative analysis. ROG is a subset of hydrocarbons (HC).

B.5 Construction Fuel Use Estimates

ESA

B.5 - Construction Fuel Use Estimates

Total Fuel Use During Contruction

Fuel Type	Fuel Consumed (gal/proj)	Fuel Consumed (av. gal/yr)	Gallons Sold in Santa Clara County in 2017	% Project gallons comp. to Co. gallons
Gasoline	13,996	6,998	685,000,000	0.001%
Diesel	467,071	233,535	70,588,000	0.331%

Diesel Fuel Use for Off-road Construction Equipment

Phase Name	Equipment Type	HP	Units	Hours/day	Days	Total Hours	Use Factor (Gal/hr)	Total Gallons
	Bore/Drill Rig	221	1	8	52	416	5.35	2,225
	Cranes	231	1	8	52	416	3.24	1,346
	Other Construction Equipm	950	1	8	52	416	17.75	7,386
Creek Diviersion & KD/CI	Pumps	250	2	8	52	832	4.69	3,898
	Cement and Mortar Mixers	100	1	8	123	984	1.75	1,723
	Graders	187	2	8	123	1968	4.34	8,538
	Off-Highway Trucks	402	2	8	123	1968	7.39	14,539
	Other Material Handling Ec	700	1	5	123	615	12.86	7,908
	Plate Compactors	8	2	8	123	1968	0.91	1,795
	Pumps	300	1	5	123	615	7.71	4,742
Levee Footprint	Rubber Tired Dozers	247	1	8	123	984	4.33	4,265
Dewatering	Pumps	100	1	24	455	10920	0.94	10,285
	Excavators	247	3	8	299	7176	4.31	30,920
Working Surface/V & DR	Rubber Tired Dozers	255	2	8	299	4784	4.33	20,736
	Graders	187	1	8	88	704	4.34	3,054
	Off-Highway Trucks	402	1	8	88	704	7.39	5,201
Lake & Levee FA	Plate Compactors	8	2	8	88	1408	0.91	1,284
	Graders	187	2	8	75	1200	4.34	5,206
	Off-Highway Trucks	402	2	8	75	1200	7.39	8,865
Islands (expanded and new)	Plate Compactors	8	4	8	75	2400	0.91	2,189
	Cranes	231	1	8	80	640	3.24	2,071
	Excavators	247	1	8	80	640	4.31	2,758
	Other Construction Equipm	30	1	8	80	640	0.91	584
	Plate Compactors	8	1	8	80	640	0.91	584
Transfer PL (from AVPL)	Rubber Tired Loaders	247	1	8	80	640	4.33	2,774
	Graders	187	1	8	103	824	4.34	3,575
	Off-Highway Trucks	402	1	8	103	824	7.39	6,088
Lake Area 2.5 CC	Plate Compactors	8	2	8	103	1648	0.91	1,503
	Graders	187	1	8	150	1200	4.34	5,206
	Off-Highway Trucks	402	1	8	150	1200	7.39	8,865
Alamitos RCA 2.5 CC	Plate Compactors	8	1	8	150	1200	0.91	1,095
	Cranes	231	1	8	58	464	3.24	1,502
	Excavators	247	1	8	80	640	4.31	2,758
	Other Construction Equipm	30	1	8	80	640	0.91	584
	Plate Compactors	8	1	8	80	640	0.91	584
Transfer PL (to LAPP)	Rubber Tired Loaders	247	1	8	80	640	4.33	2,774
	Graders	187	1	8	128	1024	4.34	4,442
	Off-Highway Trucks	402	1	8	128	1024	7.39	7,565
New Park Area	Plate Compactors	8	2	8	128	2048	0.91	1,868
	Graders	187	1	8	7	56	4.34	243
	Off-Highway Trucks	402	1	8	7	56	7.39	414
Alamitos Creek WBSG	Plate Compactors	8	1	8	7	56	0.91	51
	Excavators	158	1	4	95	380	4.31	1,637
Reveg & Landscaping	Generator Sets	84	1	6	95	570	1.75	998
Notes: Total equipment hours obained from Appendix B, Air Quality and Greenhouse Gas Emissions					Total Hours	60,012	Total	206,629
fuel use ratesderived from the Off-road 2011 model (see following page).					Ave. Gal/hr	3.44	Ave. Gal./yr.	103,315

Fuel Use for Vehicles/Locamotives During Construction

Trip Type	Total Miles	Vehicle Type	miles/gallon	Gal./project	Max Gal. Year
Diesel Trucks and Locomotives					
Cut and Fill Hauling	1,536,018	HDT	6	256,003	128,002
Vendor Hauling	26,630	HDT	6	4,438	2,219
Total	1,562,648			260,441	130,221
Gasoline Fueled Vehicle Worker Trips					
Worker Commute	307,917	auto and LDT	22	13,996	6,998
Total				13,996	6,998

HDT: heavy-duty diesel truck; auto and LDT (light-duty trucks) are gasoline fueled.
Fuel economy sources: 24/7 Wall Street, 2017; Union of Concerned Scientists, 2017.

Union of Concerned Scientists, 2017. Engines for Change (2015). Accessed webpage (http://www.ucsusa.org/clean-vehicles/fuel-efficiency/heavy-duty-truck-standards#.WO0i-Sj2aUl) April 11, 2017.
24/7 Wall Street, 2017. Average Fuel Economy for 264 Million U.S. Light Vehicles: 22 Miles per Gallon, by Paul Ausick, March 2, 2017.

Vehicle Miles Travelled During Construction

Phases	Duration (Work Days)	# of Worker Trips/Day	Worker Trip Distance (mi)	Total Worker Trip Miles	Total # of Vendor Trips/Day.	Vendor Trip Distance (mi)	Total Vendor Trip Miles
Creek Diversion & KD/CI	52	20	12.4	12,896	4	7.3	1518.4
Levee Footprint	123	20	12.4	30,504	10	7.3	8979
Dewatering	455	0	12.4	0	0	7.3	0
Working Surface/V & DR	299	20	12.4	74,152	2	7.3	4365.4
Lake & Levee FA	88	20	12.4	21,824	2	7.3	1284.8
Islands (expanded and new)	75	20	12.4	18,600	2	7.3	1095
Transfer PL (from AVPL)	80	20	12.4	19,840	2	7.3	1168
Lake Area 2.5 CC	103	20	12.4	25,544	2	7.3	1503.8
Alamitos RCA 2.5 CC	150	20	12.4	37,200	2	7.3	2190
Transfer PL (to LAPP)	80	20	12.4	19,840	2	7.3	1168
New Park Area	128	14	12.4	22,221	2	7.3	1868.8
Alamitos Creek WBSG	7	20	12.4	1,736	2	7.3	102.2
Reveg & Landscaping	95	20	12.4	23,560	2	7.3	1387
			Total	307,917		Total	26,630
			Ave. Gal./yr.	123,167		Ave. Gal./yr.	10,652

Total Weighted Cut/Fill Hauling Distance (miles) per Trip	Grand Total Trips	Total Miles
18.5	83,028	1,536,018

Source: Weighted trip distance and total trips obtained from Appendix B, Air Quality and GHG

B.6 CalEEMod Output for Regional Emissions

ESA

Almaden Lake

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	65.00	Acre	65.00	2,831,400.00	100

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - land use type

Construction Phase - schedule

Off-road Equipment - Equipment assumptions.

Off-road Equipment -

Off-road Equipment - Equipment assumptions.

Off-road Equipment - Equipment assumptions

Off-road Equipment - Equipment assumptions

Off-road Equipment - Equipment assumptions.

Off-road Equipment - equipment assumptions

Off-road Equipment - Equipment assumptions

Off-road Equipment - equipment assumptions

Off-road Equipment - Equipment assumptions.

Off-road Equipment - Equipment assumptions

Off-road Equipment - pipeline construction equipment. Other construction equipment represents butt fusion machine.

Off-road Equipment - Equipment for pipeline construction; other construction equipment represents butt fusion machine.

Off-road Equipment - Equipment assumptions

Trips and VMT - trips values are rounded up to the nearest even whole number; based on cut and fill amounts identified in the Project Description.

Grading -

Construction Off-road Equipment Mitigation - Tier 4 equipment standards for off-road.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Parking	150	0
tblAreaCoating	Area_Nonresidential_Exterior	1415700	0
tblAreaCoating	Area_Nonresidential_Interior	4247100	0
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

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tblFleetMix	OBUS	2.1770e-003	0.00
tblFleetMix	SBUS	6.3200e-004	0.00
tblFleetMix	UBUS	1.5140e-003	0.00
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tblOffRoadEquipment	HorsePower	158.00	247.00
tblOffRoadEquipment	HorsePower	158.00	247.00

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2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.4741	4.8703	3.1060	9.3600e-003	1.1589	0.1836	1.3425	0.3842	0.1728	0.5570	0.0000	835.6479	835.6479	0.1647	0.0000	839.7660
2022	1.1309	17.0840	8.3007	0.0447	1.5925	0.3422	1.9347	0.4295	0.3222	0.7517	0.0000	4,177.4769	4,177.4769	0.4899	0.0000	4,189.7250
2023	0.0969	0.9508	1.0092	2.8000e-003	0.0666	0.0345	0.1011	0.0172	0.0339	0.0511	0.0000	250.9492	250.9492	0.0229	0.0000	251.5207
Maximum	**1.1309**	**17.0840**	**8.3007**	**0.0447**	**1.5925**	**0.3422**	**1.9347**	**0.4295**	**0.3222**	**0.7517**	**0.0000**	**4,177.4769**	**4,177.4769**	**0.4899**	**0.0000**	**4,189.7250**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1175	0.8275	3.8407	9.3600e-003	1.1589	0.0157	1.1746	0.3842	0.0154	0.3996	0.0000	835.6471	835.6471	0.1647	0.0000	839.7651
2022	0.4857	10.1092	9.8102	0.0447	1.5925	0.0510	1.6434	0.4295	0.0498	0.4793	0.0000	4,177.4753	4,177.4753	0.4899	0.0000	4,189.7234
2023	0.0288	0.2859	1.1575	2.8000e-003	0.0666	2.9600e-003	0.0695	0.0172	2.9400e-003	0.0201	0.0000	250.9490	250.9490	0.0229	0.0000	251.5205
Maximum	**0.4857**	**10.1092**	**9.8102**	**0.0447**	**1.5925**	**0.0510**	**1.6434**	**0.4295**	**0.0498**	**0.4793**	**0.0000**	**4,177.4753**	**4,177.4753**	**0.4899**	**0.0000**	**4,189.7234**

Almaden Lake - Santa Clara County, Annual

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**62.86**	**51.00**	**-19.27**	**0.00**	**0.00**	**87.58**	**14.53**	**0.00**	**87.12**	**33.89**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
10	**4-24-2021**	**7-23-2021**	0.4134	0.1189
11	**7-24-2021**	**10-23-2021**	2.3793	0.2905
12	**10-24-2021**	**1-23-2022**	3.4406	0.8355
13	**1-24-2022**	**4-23-2022**	3.0921	1.3864
14	**4-24-2022**	**7-23-2022**	6.4580	3.7972
15	**7-24-2022**	**10-23-2022**	5.0914	3.1604
16	**10-24-2022**	**1-23-2023**	2.8884	1.9738
17	**1-24-2023**	**4-23-2023**	0.6758	0.1886
18	**4-24-2023**	**7-23-2023**	0.0861	0.0115
		Highest	6.4580	3.7972

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	1.1347	0.0000	1.1347	0.0671	0.0000	2.8112
Water						0.0000	0.0000		0.0000	0.0000	0.0000	78.8551	78.8551	3.5700e-003	7.4000e-004	79.1640
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**0.3079**	**0.0000**	**0.3079**	**0.0756**	**0.0000**	**0.0756**	**1.1347**	**78.8562**	**79.9909**	**0.0706**	**7.4000e-004**	**81.9765**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	1.1347	0.0000	1.1347	0.0671	0.0000	2.8112
Water						0.0000	0.0000		0.0000	0.0000	0.0000	78.8551	78.8551	3.5700e-003	7.4000e-004	79.1640
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**0.3079**	**0.0000**	**0.3079**	**0.0756**	**0.0000**	**0.0756**	**1.1347**	**78.8562**	**79.9909**	**0.0706**	**7.4000e-004**	**81.9765**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Creek Diviersion & KD/CI	Trenching	6/1/2021	8/11/2021	5	52	Creek Diversion & Lake Drainage/Cofferdam
2	Levee Footprint	Grading	8/12/2021	1/31/2022	5	123	Levee Footprint
3	Dewatering	Trenching	8/12/2021	5/10/2023	5	455	Dewatering
4	Working Surface/V & DR	Building Construction	8/12/2021	10/4/2022	5	299	Working Surface/Vegetation & Debris Removal
5	Lake & Levee FA	Grading	12/4/2021	4/6/2022	5	88	Lake & Levee Foundation Area
6	Islands (expanded and new)	Grading	4/6/2022	7/19/2022	5	75	Expanded Existing Island and New Island
7	Transfer PL (from AVPL)	Trenching	4/6/2022	7/26/2022	5	80	Transfer Pipeline from Almaden Valley Pipeline
8	Lake Area 2.5 CC	Paving	4/6/2022	8/26/2022	5	103	Lake Area w/2.5' Clay Cap
9	Alamitos RCA 2.5 CC	Paving	6/1/2022	12/27/2022	5	150	Alamitos Restored Channel Area w/ 2.5' Clay Cap
10	Transfer PL (to LAPP)	Trenching	6/25/2022	10/14/2022	5	80	Transfer Pipeline to Los Alamitos Percolation Pond
11	New Park Area	Building Construction	8/26/2022	2/21/2023	5	128	New Park Area
12	Alamitos Creek WBSG	Grading	10/22/2022	11/1/2022	5	7	Alamitos Creek West Bank Shore Grading
13	Reveg & Landscaping	Site Preparation	12/28/2022	5/9/2023	5	95	Revegetation & Landscaping

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Creek Diviersion & KD/CI	Bore/Drill Rigs	1	8.00	221	0.50
Creek Diviersion & KD/CI	Cranes	1	8.00	231	0.29

Creek Diviersion & KD/CI	Other Construction Equipment	1	8.00	950	0.50
Creek Diviersion & KD/CI	Pumps	2	8.00	250	0.74
Levee Footprint	Cement and Mortar Mixers	1	8.00	100	0.56
Levee Footprint	Graders	2	8.00	187	0.41
Levee Footprint	Off-Highway Trucks	2	8.00	402	0.38
Levee Footprint	Other Material Handling Equipment	1	5.00	700	0.40
Levee Footprint	Plate Compactors	2	8.00	8	0.43
Levee Footprint	Pumps	1	5.00	300	0.74
Levee Footprint	Rubber Tired Dozers	1	8.00	247	0.40
Dewatering	Pumps	1	24.00	100	0.74
Working Surface/V & DR	Excavators	3	8.00	247	0.40
Working Surface/V & DR	Rubber Tired Dozers	2	8.00	255	0.40
Lake & Levee FA	Graders	1	8.00	187	0.41
Lake & Levee FA	Off-Highway Trucks	1	8.00	402	0.38
Lake & Levee FA	Plate Compactors	2	8.00	8	0.43
Islands (expanded and new)	Graders	2	8.00	187	0.41
Islands (expanded and new)	Off-Highway Trucks	2	8.00	402	0.38
Islands (expanded and new)	Plate Compactors	4	8.00	8	0.43
Transfer PL (from AVPL)	Cranes	1	8.00	231	0.29
Transfer PL (from AVPL)	Excavators	1	8.00	247	0.38
Transfer PL (from AVPL)	Other Construction Equipment	1	8.00	30	0.42
Transfer PL (from AVPL)	Plate Compactors	1	8.00	8	0.43
Transfer PL (from AVPL)	Rubber Tired Loaders	1	8.00	247	0.36
Lake Area 2.5 CC	Graders	1	8.00	187	0.41
Lake Area 2.5 CC	Off-Highway Trucks	1	8.00	402	0.38
Lake Area 2.5 CC	Plate Compactors	2	8.00	8	0.43
Alamitos RCA 2.5 CC	Graders	1	8.00	187	0.41

Alamitos RCA 2.5 CC	Off-Highway Trucks	1	8.00	402	0.38
Alamitos RCA 2.5 CC	Plate Compactors	1	8.00	8	0.43
Transfer PL (to LAPP)	Cranes	1	8.00	231	0.29
Transfer PL (to LAPP)	Excavators	1	8.00	247	0.38
Transfer PL (to LAPP)	Other Construction Equipment	1	8.00	30	0.42
Transfer PL (to LAPP)	Plate Compactors	1	8.00	8	0.43
Transfer PL (to LAPP)	Rubber Tired Loaders	1	8.00	247	0.36
New Park Area	Graders	1	8.00	187	0.41
New Park Area	Off-Highway Trucks	1	8.00	402	0.38
New Park Area	Plate Compactors	2	8.00	8	0.43
Alamitos Creek WBSG	Graders	1	8.00	187	0.41
Alamitos Creek WBSG	Off-Highway Trucks	1	8.00	402	0.38
Alamitos Creek WBSG	Plate Compactors	1	8.00	8	0.43
Reveg & Landscaping	Excavators	1	4.00	158	0.38
Reveg & Landscaping	Generator Sets	1	6.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Creek Diviersion & KD/CI	5	20.00	4.00	0.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Levee Footprint	10	20.00	10.00	0.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Dewatering	1	0.00	0.00	0.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Working Surface/V & DP	5	20.00	2.00	0.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Lake & Levee FA	4	20.00	2.00	9,424.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Islands (expanded and new)	8	20.00	2.00	6,250.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Transfer PL (from AVPL)	5	20.00	2.00	66.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Lake Area 2.5 CC	4	20.00	2.00	23,316.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Alamitos RCA 2.5 CC	3	20.00	2.00	32,544.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Transfer PL (to LAPP)	5	20.00	2.00	1,706.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
New Park Area	4	14.00	2.00	8,534.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Alamitos Creek WBSG	3	20.00	2.00	1,194.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Reveg & Landscaping	2	20.00	2.00	0.00	12.40	7.30	18.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Creek Diviersion & KD/CI - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0509	0.5031	0.2804	1.4100e-003		0.0163	0.0163		0.0157	0.0157	0.0000	122.1641	122.1641	0.0138	0.0000	122.5100
Total	**0.0509**	**0.5031**	**0.2804**	**1.4100e-003**		**0.0163**	**0.0163**		**0.0157**	**0.0157**	**0.0000**	**122.1641**	**122.1641**	**0.0138**	**0.0000**	**122.5100**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.4000e-004	0.0107	2.8400e-003	3.0000e-005	6.8000e-004	2.0000e-005	7.1000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6939	2.6939	1.2000e-004	0.0000	2.6968
Worker	1.7800e-003	1.2500e-003	0.0133	4.0000e-005	4.7300e-003	3.0000e-005	4.7600e-003	1.2600e-003	3.0000e-005	1.2900e-003	0.0000	3.9047	3.9047	9.0000e-005	0.0000	3.9069
Total	**2.1200e-003**	**0.0119**	**0.0162**	**7.0000e-005**	**5.4100e-003**	**5.0000e-005**	**5.4700e-003**	**1.4600e-003**	**5.0000e-005**	**1.5100e-003**	**0.0000**	**6.5986**	**6.5986**	**2.1000e-004**	**0.0000**	**6.6038**

3.2 Creek Diviersion & KD/CI - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0187	0.1307	0.4948	1.4100e-003		3.9900e-003	3.9900e-003		3.7900e-003	3.7900e-003	0.0000	122.1639	122.1639	0.0138	0.0000	122.5099
Total	**0.0187**	**0.1307**	**0.4948**	**1.4100e-003**		**3.9900e-003**	**3.9900e-003**		**3.7900e-003**	**3.7900e-003**	**0.0000**	**122.1639**	**122.1639**	**0.0138**	**0.0000**	**122.5099**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.4000e-004	0.0107	2.8400e-003	3.0000e-005	6.8000e-004	2.0000e-005	7.1000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6939	2.6939	1.2000e-004	0.0000	2.6968
Worker	1.7800e-003	1.2500e-003	0.0133	4.0000e-005	4.7300e-003	3.0000e-005	4.7600e-003	1.2600e-003	3.0000e-005	1.2900e-003	0.0000	3.9047	3.9047	9.0000e-005	0.0000	3.9069
Total	**2.1200e-003**	**0.0119**	**0.0162**	**7.0000e-005**	**5.4100e-003**	**5.0000e-005**	**5.4700e-003**	**1.4600e-003**	**5.0000e-005**	**1.5100e-003**	**0.0000**	**6.5986**	**6.5986**	**2.1000e-004**	**0.0000**	**6.6038**

3.3 Levee Footprint - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3289	0.0000	0.3289	0.1712	0.0000	0.1712	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1891	1.9240	0.9010	3.1300e-003		0.0732	0.0732		0.0680	0.0680	0.0000	283.4941	283.4941	0.0721	0.0000	285.2967
Total	**0.1891**	**1.9240**	**0.9010**	**3.1300e-003**	**0.3289**	**0.0732**	**0.4021**	**0.1712**	**0.0680**	**0.2391**	**0.0000**	**283.4941**	**283.4941**	**0.0721**	**0.0000**	**285.2967**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6600e-003	0.0524	0.0140	1.4000e-004	3.3600e-003	1.2000e-004	3.4700e-003	9.7000e-004	1.1000e-004	1.0800e-003	0.0000	13.2105	13.2105	5.8000e-004	0.0000	13.2249
Worker	3.4900e-003	2.4600e-003	0.0262	8.0000e-005	9.2900e-003	6.0000e-005	9.3400e-003	2.4700e-003	5.0000e-005	2.5200e-003	0.0000	7.6592	7.6592	1.7000e-004	0.0000	7.6635
Total	**5.1500e-003**	**0.0549**	**0.0401**	**2.2000e-004**	**0.0127**	**1.8000e-004**	**0.0128**	**3.4400e-003**	**1.6000e-004**	**3.6000e-003**	**0.0000**	**20.8697**	**20.8697**	**7.5000e-004**	**0.0000**	**20.8884**

3.3 Levee Footprint - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3289	0.0000	0.3289	0.1712	0.0000	0.1712	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0376	0.1629	1.3781	3.1300e-003		5.0100e-003	5.0100e-003		5.0100e-003	5.0100e-003	0.0000	283.4938	283.4938	0.0721	0.0000	285.2964
Total	**0.0376**	**0.1629**	**1.3781**	**3.1300e-003**	**0.3289**	**5.0100e-003**	**0.3339**	**0.1712**	**5.0100e-003**	**0.1762**	**0.0000**	**283.4938**	**283.4938**	**0.0721**	**0.0000**	**285.2964**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6600e-003	0.0524	0.0140	1.4000e-004	3.3600e-003	1.2000e-004	3.4700e-003	9.7000e-004	1.1000e-004	1.0800e-003	0.0000	13.2105	13.2105	5.8000e-004	0.0000	13.2249
Worker	3.4900e-003	2.4600e-003	0.0262	8.0000e-005	9.2900e-003	6.0000e-005	9.3400e-003	2.4700e-003	5.0000e-005	2.5200e-003	0.0000	7.6592	7.6592	1.7000e-004	0.0000	7.6635
Total	**5.1500e-003**	**0.0549**	**0.0401**	**2.2000e-004**	**0.0127**	**1.8000e-004**	**0.0128**	**3.4400e-003**	**1.6000e-004**	**3.6000e-003**	**0.0000**	**20.8697**	**20.8697**	**7.5000e-004**	**0.0000**	**20.8884**

3.3 Levee Footprint - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0850	0.0000	0.0850	0.0371	0.0000	0.0371	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0341	0.3284	0.1744	6.4000e-004		0.0123	0.0123		0.0114	0.0114	0.0000	58.3645	58.3645	0.0148	0.0000	58.7351
Total	**0.0341**	**0.3284**	**0.1744**	**6.4000e-004**	**0.0850**	**0.0123**	**0.0973**	**0.0371**	**0.0114**	**0.0485**	**0.0000**	**58.3645**	**58.3645**	**0.0148**	**0.0000**	**58.7351**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-004	0.0102	2.7100e-003	3.0000e-005	6.9000e-004	2.0000e-005	7.1000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6938	2.6938	1.1000e-004	0.0000	2.6966
Worker	6.7000e-004	4.5000e-004	4.9500e-003	2.0000e-005	1.9100e-003	1.0000e-005	1.9200e-003	5.1000e-004	1.0000e-005	5.2000e-004	0.0000	1.5196	1.5196	3.0000e-005	0.0000	1.5204
Total	**9.9000e-004**	**0.0107**	**7.6600e-003**	**5.0000e-005**	**2.6000e-003**	**3.0000e-005**	**2.6300e-003**	**7.1000e-004**	**3.0000e-005**	**7.4000e-004**	**0.0000**	**4.2134**	**4.2134**	**1.4000e-004**	**0.0000**	**4.2170**

3.3 Levee Footprint - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0850	0.0000	0.0850	0.0371	0.0000	0.0371	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.7400e-003	0.0335	0.2837	6.4000e-004		1.0300e-003	1.0300e-003		1.0300e-003	1.0300e-003	0.0000	58.3645	58.3645	0.0148	0.0000	58.7350
Total	**7.7400e-003**	**0.0335**	**0.2837**	**6.4000e-004**	**0.0850**	**1.0300e-003**	**0.0860**	**0.0371**	**1.0300e-003**	**0.0381**	**0.0000**	**58.3645**	**58.3645**	**0.0148**	**0.0000**	**58.7350**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-004	0.0102	2.7100e-003	3.0000e-005	6.9000e-004	2.0000e-005	7.1000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6938	2.6938	1.1000e-004	0.0000	2.6966
Worker	6.7000e-004	4.5000e-004	4.9500e-003	2.0000e-005	1.9100e-003	1.0000e-005	1.9200e-003	5.1000e-004	1.0000e-005	5.2000e-004	0.0000	1.5196	1.5196	3.0000e-005	0.0000	1.5204
Total	**9.9000e-004**	**0.0107**	**7.6600e-003**	**5.0000e-005**	**2.6000e-003**	**3.0000e-005**	**2.6300e-003**	**7.1000e-004**	**3.0000e-005**	**7.4000e-004**	**0.0000**	**4.2134**	**4.2134**	**1.4000e-004**	**0.0000**	**4.2170**

3.4 Dewatering - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0693	0.5847	0.6813	1.2000e-003		0.0324	0.0324		0.0324	0.0324	0.0000	102.9487	102.9487	5.6200e-003	0.0000	103.0891
Total	**0.0693**	**0.5847**	**0.6813**	**1.2000e-003**		**0.0324**	**0.0324**		**0.0324**	**0.0324**	**0.0000**	**102.9487**	**102.9487**	**5.6200e-003**	**0.0000**	**103.0891**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Dewatering - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0120	0.0519	0.7388	1.2000e-003		1.6000e-003	1.6000e-003		1.6000e-003	1.6000e-003	0.0000	102.9486	102.9486	5.6200e-003	0.0000	103.0890
Total	**0.0120**	**0.0519**	**0.7388**	**1.2000e-003**		**1.6000e-003**	**1.6000e-003**		**1.6000e-003**	**1.6000e-003**	**0.0000**	**102.9486**	**102.9486**	**5.6200e-003**	**0.0000**	**103.0890**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Dewatering - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1634	1.3784	1.7327	3.0500e-003		0.0723	0.0723		0.0723	0.0723	0.0000	262.4178	262.4178	0.0134	0.0000	262.7525
Total	**0.1634**	**1.3784**	**1.7327**	**3.0500e-003**		**0.0723**	**0.0723**		**0.0723**	**0.0723**	**0.0000**	**262.4178**	**262.4178**	**0.0134**	**0.0000**	**262.7525**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Dewatering - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0305	0.1323	1.8833	3.0500e-003		4.0700e-003	4.0700e-003		4.0700e-003	4.0700e-003	0.0000	262.4174	262.4174	0.0134	0.0000	262.7522
Total	**0.0305**	**0.1323**	**1.8833**	**3.0500e-003**		**4.0700e-003**	**4.0700e-003**		**4.0700e-003**	**4.0700e-003**	**0.0000**	**262.4174**	**262.4174**	**0.0134**	**0.0000**	**262.7522**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Dewatering - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0544	0.4572	0.6187	1.0900e-003		0.0224	0.0224		0.0224	0.0224	0.0000	93.8648	93.8648	4.2900e-003	0.0000	93.9722
Total	**0.0544**	**0.4572**	**0.6187**	**1.0900e-003**		**0.0224**	**0.0224**		**0.0224**	**0.0224**	**0.0000**	**93.8648**	**93.8648**	**4.2900e-003**	**0.0000**	**93.9722**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Dewatering - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0109	0.0473	0.6737	1.0900e-003		1.4600e-003	1.4600e-003		1.4600e-003	1.4600e-003	0.0000	93.8647	93.8647	4.2900e-003	0.0000	93.9721
Total	**0.0109**	**0.0473**	**0.6737**	**1.0900e-003**		**1.4600e-003**	**1.4600e-003**		**1.4600e-003**	**1.4600e-003**	**0.0000**	**93.8647**	**93.8647**	**4.2900e-003**	**0.0000**	**93.9721**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.5 Working Surface/V & DR - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1337	1.3871	1.0357	2.2100e-003		0.0565	0.0565		0.0520	0.0520	0.0000	193.8431	193.8431	0.0627	0.0000	195.4104
Total	**0.1337**	**1.3871**	**1.0357**	**2.2100e-003**		**0.0565**	**0.0565**		**0.0520**	**0.0520**	**0.0000**	**193.8431**	**193.8431**	**0.0627**	**0.0000**	**195.4104**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3000e-004	0.0105	2.7900e-003	3.0000e-005	6.7000e-004	2.0000e-005	6.9000e-004	1.9000e-004	2.0000e-005	2.2000e-004	0.0000	2.6421	2.6421	1.2000e-004	0.0000	2.6450
Worker	3.4900e-003	2.4600e-003	0.0262	8.0000e-005	9.2900e-003	6.0000e-005	9.3400e-003	2.4700e-003	5.0000e-005	2.5200e-003	0.0000	7.6592	7.6592	1.7000e-004	0.0000	7.6635
Total	**3.8200e-003**	**0.0129**	**0.0290**	**1.1000e-004**	**9.9600e-003**	**8.0000e-005**	**0.0100**	**2.6600e-003**	**7.0000e-005**	**2.7400e-003**	**0.0000**	**10.3013**	**10.3013**	**2.9000e-004**	**0.0000**	**10.3085**

3.5 Working Surface/V & DR - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0270	0.1170	0.9902	2.2100e-003		3.6000e-003	3.6000e-003		3.6000e-003	3.6000e-003	0.0000	193.8428	193.8428	0.0627	0.0000	195.4102
Total	**0.0270**	**0.1170**	**0.9902**	**2.2100e-003**		**3.6000e-003**	**3.6000e-003**		**3.6000e-003**	**3.6000e-003**	**0.0000**	**193.8428**	**193.8428**	**0.0627**	**0.0000**	**195.4102**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3000e-004	0.0105	2.7900e-003	3.0000e-005	6.7000e-004	2.0000e-005	6.9000e-004	1.9000e-004	2.0000e-005	2.2000e-004	0.0000	2.6421	2.6421	1.2000e-004	0.0000	2.6450
Worker	3.4900e-003	2.4600e-003	0.0262	8.0000e-005	9.2900e-003	6.0000e-005	9.3400e-003	2.4700e-003	5.0000e-005	2.5200e-003	0.0000	7.6592	7.6592	1.7000e-004	0.0000	7.6635
Total	**3.8200e-003**	**0.0129**	**0.0290**	**1.1000e-004**	**9.9600e-003**	**8.0000e-005**	**0.0100**	**2.6600e-003**	**7.0000e-005**	**2.7400e-003**	**0.0000**	**10.3013**	**10.3013**	**2.9000e-004**	**0.0000**	**10.3085**

3.5 Working Surface/V & DR - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2447	2.4176	1.9424	4.2600e-003		0.1004	0.1004		0.0923	0.0923	0.0000	374.6032	374.6032	0.1212	0.0000	377.6321
Total	**0.2447**	**2.4176**	**1.9424**	**4.2600e-003**		**0.1004**	**0.1004**		**0.0923**	**0.0923**	**0.0000**	**374.6032**	**374.6032**	**0.1212**	**0.0000**	**377.6321**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.0000e-004	0.0191	5.0800e-003	5.0000e-005	1.3000e-003	4.0000e-005	1.3400e-003	3.7000e-004	4.0000e-005	4.1000e-004	0.0000	5.0541	5.0541	2.1000e-004	0.0000	5.0594
Worker	6.2900e-003	4.2600e-003	0.0465	1.6000e-004	0.0179	1.1000e-004	0.0180	4.7700e-003	1.0000e-004	4.8700e-003	0.0000	14.2554	14.2554	3.0000e-004	0.0000	14.2628
Total	**6.8900e-003**	**0.0234**	**0.0515**	**2.1000e-004**	**0.0192**	**1.5000e-004**	**0.0194**	**5.1400e-003**	**1.4000e-004**	**5.2800e-003**	**0.0000**	**19.3094**	**19.3094**	**5.1000e-004**	**0.0000**	**19.3222**

3.5 Working Surface/V & DR - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0522	0.2260	1.9125	4.2600e-003		6.9500e-003	6.9500e-003		6.9500e-003	6.9500e-003	0.0000	374.6028	374.6028	0.1212	0.0000	377.6316
Total	**0.0522**	**0.2260**	**1.9125**	**4.2600e-003**		**6.9500e-003**	**6.9500e-003**		**6.9500e-003**	**6.9500e-003**	**0.0000**	**374.6028**	**374.6028**	**0.1212**	**0.0000**	**377.6316**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.0000e-004	0.0191	5.0800e-003	5.0000e-005	1.3000e-003	4.0000e-005	1.3400e-003	3.7000e-004	4.0000e-005	4.1000e-004	0.0000	5.0541	5.0541	2.1000e-004	0.0000	5.0594
Worker	6.2900e-003	4.2600e-003	0.0465	1.6000e-004	0.0179	1.1000e-004	0.0180	4.7700e-003	1.0000e-004	4.8700e-003	0.0000	14.2554	14.2554	3.0000e-004	0.0000	14.2628
Total	**6.8900e-003**	**0.0234**	**0.0515**	**2.1000e-004**	**0.0192**	**1.5000e-004**	**0.0194**	**5.1400e-003**	**1.4000e-004**	**5.2800e-003**	**0.0000**	**19.3094**	**19.3094**	**5.1000e-004**	**0.0000**	**19.3222**

3.6 Lake & Levee FA - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0114	0.1169	0.0579	2.1000e-004		4.0000e-003	4.0000e-003		3.7000e-003	3.7000e-003	0.0000	18.0454	18.0454	5.7000e-003	0.0000	18.1879
Total	**0.0114**	**0.1169**	**0.0579**	**2.1000e-004**	**0.7405**	**4.0000e-003**	**0.7445**	**0.1898**	**3.7000e-003**	**0.1935**	**0.0000**	**18.0454**	**18.0454**	**5.7000e-003**	**0.0000**	**18.1879**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.9100e-003	0.2722	0.0589	7.8000e-004	0.0596	8.3000e-004	0.0604	0.0151	7.9000e-004	0.0159	0.0000	75.3630	75.3630	3.4800e-003	0.0000	75.4500
Vendor	7.0000e-005	2.0600e-003	5.5000e-004	1.0000e-005	1.3000e-004	0.0000	1.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.5181	0.5181	2.0000e-005	0.0000	0.5186
Worker	6.8000e-004	4.8000e-004	5.1300e-003	2.0000e-005	1.8200e-003	1.0000e-005	1.8300e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.5018	1.5018	3.0000e-005	0.0000	1.5027
Total	**8.6600e-003**	**0.2747**	**0.0645**	**8.1000e-004**	**0.0615**	**8.4000e-004**	**0.0624**	**0.0156**	**8.0000e-004**	**0.0164**	**0.0000**	**77.3828**	**77.3828**	**3.5300e-003**	**0.0000**	**77.4713**

3.6 Lake & Levee FA - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.4300e-003	0.0105	0.0890	2.1000e-004		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	18.0454	18.0454	5.7000e-003	0.0000	18.1879
Total	**2.4300e-003**	**0.0105**	**0.0890**	**2.1000e-004**	**0.7405**	**3.2000e-004**	**0.7408**	**0.1898**	**3.2000e-004**	**0.1901**	**0.0000**	**18.0454**	**18.0454**	**5.7000e-003**	**0.0000**	**18.1879**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.9100e-003	0.2722	0.0589	7.8000e-004	0.0596	8.3000e-004	0.0604	0.0151	7.9000e-004	0.0159	0.0000	75.3630	75.3630	3.4800e-003	0.0000	75.4500
Vendor	7.0000e-005	2.0600e-003	5.5000e-004	1.0000e-005	1.3000e-004	0.0000	1.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.5181	0.5181	2.0000e-005	0.0000	0.5186
Worker	6.8000e-004	4.8000e-004	5.1300e-003	2.0000e-005	1.8200e-003	1.0000e-005	1.8300e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.5018	1.5018	3.0000e-005	0.0000	1.5027
Total	**8.6600e-003**	**0.2747**	**0.0645**	**8.1000e-004**	**0.0615**	**8.4000e-004**	**0.0624**	**0.0156**	**8.0000e-004**	**0.0164**	**0.0000**	**77.3828**	**77.3828**	**3.5300e-003**	**0.0000**	**77.4713**

3.6 Lake & Levee FA - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0348	0.3323	0.1871	7.1000e-004		0.0113	0.0113		0.0105	0.0105	0.0000	61.3562	61.3562	0.0194	0.0000	61.8406
Total	**0.0348**	**0.3323**	**0.1871**	**7.1000e-004**	**0.7405**	**0.0113**	**0.7518**	**0.1898**	**0.0105**	**0.2003**	**0.0000**	**61.3562**	**61.3562**	**0.0194**	**0.0000**	**61.8406**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0253	0.8511	0.1966	2.6100e-003	0.0697	2.4200e-003	0.0721	0.0188	2.3100e-003	0.0211	0.0000	252.7913	252.7913	0.0116	0.0000	253.0801
Vendor	2.1000e-004	6.6100e-003	1.7500e-003	2.0000e-005	4.5000e-004	1.0000e-005	4.6000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.7446	1.7446	7.0000e-005	0.0000	1.7464
Worker	2.1700e-003	1.4700e-003	0.0160	5.0000e-005	6.1900e-003	4.0000e-005	6.2300e-003	1.6500e-003	3.0000e-005	1.6800e-003	0.0000	4.9206	4.9206	1.0000e-004	0.0000	4.9232
Total	**0.0277**	**0.8591**	**0.2144**	**2.6800e-003**	**0.0763**	**2.4700e-003**	**0.0788**	**0.0206**	**2.3500e-003**	**0.0229**	**0.0000**	**259.4564**	**259.4564**	**0.0117**	**0.0000**	**259.7497**

3.6 Lake & Levee FA - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.2500e-003	0.0358	0.3027	7.1000e-004		1.1000e-003	1.1000e-003		1.1000e-003	1.1000e-003	0.0000	61.3561	61.3561	0.0194	0.0000	61.8405
Total	**8.2500e-003**	**0.0358**	**0.3027**	**7.1000e-004**	**0.7405**	**1.1000e-003**	**0.7416**	**0.1898**	**1.1000e-003**	**0.1909**	**0.0000**	**61.3561**	**61.3561**	**0.0194**	**0.0000**	**61.8405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0253	0.8511	0.1966	2.6100e-003	0.0697	2.4200e-003	0.0721	0.0188	2.3100e-003	0.0211	0.0000	252.7913	252.7913	0.0116	0.0000	253.0801
Vendor	2.1000e-004	6.6100e-003	1.7500e-003	2.0000e-005	4.5000e-004	1.0000e-005	4.6000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.7446	1.7446	7.0000e-005	0.0000	1.7464
Worker	2.1700e-003	1.4700e-003	0.0160	5.0000e-005	6.1900e-003	4.0000e-005	6.2300e-003	1.6500e-003	3.0000e-005	1.6800e-003	0.0000	4.9206	4.9206	1.0000e-004	0.0000	4.9232
Total	**0.0277**	**0.8591**	**0.2144**	**2.6800e-003**	**0.0763**	**2.4700e-003**	**0.0788**	**0.0206**	**2.3500e-003**	**0.0229**	**0.0000**	**259.4564**	**259.4564**	**0.0117**	**0.0000**	**259.7497**

3.7 Islands (expanded and new) - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0398	0.0000	0.0398	4.2900e-003	0.0000	4.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0768	0.7330	0.4126	1.5600e-003		0.0250	0.0250		0.0231	0.0231	0.0000	135.3445	135.3445	0.0427	0.0000	136.4130
Total	**0.0768**	**0.7330**	**0.4126**	**1.5600e-003**	**0.0398**	**0.0250**	**0.0647**	**4.2900e-003**	**0.0231**	**0.0274**	**0.0000**	**135.3445**	**135.3445**	**0.0427**	**0.0000**	**136.4130**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0217	0.7304	0.1688	2.2400e-003	0.0490	2.0800e-003	0.0511	0.0135	1.9900e-003	0.0155	0.0000	216.9604	216.9604	9.9200e-003	0.0000	217.2084
Vendor	2.3000e-004	7.2900e-003	1.9300e-003	2.0000e-005	4.9000e-004	1.0000e-005	5.1000e-004	1.4000e-004	1.0000e-005	1.6000e-004	0.0000	1.9241	1.9241	8.0000e-005	0.0000	1.9262
Worker	2.3900e-003	1.6200e-003	0.0177	6.0000e-005	6.8300e-003	4.0000e-005	6.8700e-003	1.8200e-003	4.0000e-005	1.8500e-003	0.0000	5.4272	5.4272	1.1000e-004	0.0000	5.4300
Total	**0.0244**	**0.7393**	**0.1884**	**2.3200e-003**	**0.0563**	**2.1300e-003**	**0.0585**	**0.0154**	**2.0400e-003**	**0.0175**	**0.0000**	**224.3117**	**224.3117**	**0.0101**	**0.0000**	**224.5645**

3.7 Islands (expanded and new) - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0398	0.0000	0.0398	4.2900e-003	0.0000	4.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0182	0.0789	0.6677	1.5600e-003		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	135.3443	135.3443	0.0427	0.0000	136.4129
Total	**0.0182**	**0.0789**	**0.6677**	**1.5600e-003**	**0.0398**	**2.4300e-003**	**0.0422**	**4.2900e-003**	**2.4300e-003**	**6.7200e-003**	**0.0000**	**135.3443**	**135.3443**	**0.0427**	**0.0000**	**136.4129**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0217	0.7304	0.1688	2.2400e-003	0.0490	2.0800e-003	0.0511	0.0135	1.9900e-003	0.0155	0.0000	216.9604	216.9604	9.9200e-003	0.0000	217.2084
Vendor	2.3000e-004	7.2900e-003	1.9300e-003	2.0000e-005	4.9000e-004	1.0000e-005	5.1000e-004	1.4000e-004	1.0000e-005	1.6000e-004	0.0000	1.9241	1.9241	8.0000e-005	0.0000	1.9262
Worker	2.3900e-003	1.6200e-003	0.0177	6.0000e-005	6.8300e-003	4.0000e-005	6.8700e-003	1.8200e-003	4.0000e-005	1.8500e-003	0.0000	5.4272	5.4272	1.1000e-004	0.0000	5.4300
Total	**0.0244**	**0.7393**	**0.1884**	**2.3200e-003**	**0.0563**	**2.1300e-003**	**0.0585**	**0.0154**	**2.0400e-003**	**0.0175**	**0.0000**	**224.3117**	**224.3117**	**0.0101**	**0.0000**	**224.5645**

3.8 Transfer PL (from AVPL) - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0487	0.4586	0.2769	9.3000e-004		0.0183	0.0183		0.0168	0.0168	0.0000	80.8944	80.8944	0.0259	0.0000	81.5416
Total	**0.0487**	**0.4586**	**0.2769**	**9.3000e-004**		**0.0183**	**0.0183**		**0.0168**	**0.0168**	**0.0000**	**80.8944**	**80.8944**	**0.0259**	**0.0000**	**81.5416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.3000e-004	7.7100e-003	1.7800e-003	2.0000e-005	5.2000e-004	2.0000e-005	5.4000e-004	1.4000e-004	2.0000e-005	1.6000e-004	0.0000	2.2911	2.2911	1.0000e-004	0.0000	2.2937
Vendor	2.4000e-004	7.7700e-003	2.0600e-003	2.0000e-005	5.3000e-004	2.0000e-005	5.4000e-004	1.5000e-004	2.0000e-005	1.7000e-004	0.0000	2.0524	2.0524	9.0000e-005	0.0000	2.0546
Worker	2.5500e-003	1.7300e-003	0.0189	6.0000e-005	7.2800e-003	4.0000e-005	7.3300e-003	1.9400e-003	4.0000e-005	1.9800e-003	0.0000	5.7890	5.7890	1.2000e-004	0.0000	5.7920
Total	**3.0200e-003**	**0.0172**	**0.0227**	**1.0000e-004**	**8.3300e-003**	**8.0000e-005**	**8.4100e-003**	**2.2300e-003**	**8.0000e-005**	**2.3100e-003**	**0.0000**	**10.1325**	**10.1325**	**3.1000e-004**	**0.0000**	**10.1403**

3.8 Transfer PL (from AVPL) - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0116	0.0703	0.4241	9.3000e-004		1.4800e-003	1.4800e-003		1.4800e-003	1.4800e-003	0.0000	80.8943	80.8943	0.0259	0.0000	81.5415
Total	**0.0116**	**0.0703**	**0.4241**	**9.3000e-004**		**1.4800e-003**	**1.4800e-003**		**1.4800e-003**	**1.4800e-003**	**0.0000**	**80.8943**	**80.8943**	**0.0259**	**0.0000**	**81.5415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.3000e-004	7.7100e-003	1.7800e-003	2.0000e-005	5.2000e-004	2.0000e-005	5.4000e-004	1.4000e-004	2.0000e-005	1.6000e-004	0.0000	2.2911	2.2911	1.0000e-004	0.0000	2.2937
Vendor	2.4000e-004	7.7700e-003	2.0600e-003	2.0000e-005	5.3000e-004	2.0000e-005	5.4000e-004	1.5000e-004	2.0000e-005	1.7000e-004	0.0000	2.0524	2.0524	9.0000e-005	0.0000	2.0546
Worker	2.5500e-003	1.7300e-003	0.0189	6.0000e-005	7.2800e-003	4.0000e-005	7.3300e-003	1.9400e-003	4.0000e-005	1.9800e-003	0.0000	5.7890	5.7890	1.2000e-004	0.0000	5.7920
Total	**3.0200e-003**	**0.0172**	**0.0227**	**1.0000e-004**	**8.3300e-003**	**8.0000e-005**	**8.4100e-003**	**2.2300e-003**	**8.0000e-005**	**2.3100e-003**	**0.0000**	**10.1325**	**10.1325**	**3.1000e-004**	**0.0000**	**10.1403**

3.9 Lake Area 2.5 CC - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0527	0.5034	0.2833	1.0700e-003		0.0171	0.0171		0.0158	0.0158	0.0000	92.9365	92.9365	0.0294	0.0000	93.6703
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0527**	**0.5034**	**0.2833**	**1.0700e-003**		**0.0171**	**0.0171**		**0.0158**	**0.0158**	**0.0000**	**92.9365**	**92.9365**	**0.0294**	**0.0000**	**93.6703**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0811	2.7249	0.6296	8.3500e-003	0.1829	7.7400e-003	0.1906	0.0503	7.4100e-003	0.0577	0.0000	809.3839	809.3839	0.0370	0.0000	810.3088
Vendor	3.1000e-004	0.0100	2.6500e-003	3.0000e-005	6.8000e-004	2.0000e-005	7.0000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6425	2.6425	1.1000e-004	0.0000	2.6453
Worker	3.2900e-003	2.2300e-003	0.0243	8.0000e-005	9.3800e-003	6.0000e-005	9.4300e-003	2.4900e-003	5.0000e-005	2.5500e-003	0.0000	7.4533	7.4533	1.6000e-004	0.0000	7.4572
Total	**0.0847**	**2.7371**	**0.6565**	**8.4600e-003**	**0.1929**	**7.8200e-003**	**0.2007**	**0.0530**	**7.4800e-003**	**0.0605**	**0.0000**	**819.4797**	**819.4797**	**0.0373**	**0.0000**	**820.4113**

3.9 Lake Area 2.5 CC - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0125	0.0542	0.4585	1.0700e-003		1.6700e-003	1.6700e-003		1.6700e-003	1.6700e-003	0.0000	92.9364	92.9364	0.0294	0.0000	93.6702
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0125**	**0.0542**	**0.4585**	**1.0700e-003**		**1.6700e-003**	**1.6700e-003**		**1.6700e-003**	**1.6700e-003**	**0.0000**	**92.9364**	**92.9364**	**0.0294**	**0.0000**	**93.6702**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0811	2.7249	0.6296	8.3500e-003	0.1829	7.7400e-003	0.1906	0.0503	7.4100e-003	0.0577	0.0000	809.3839	809.3839	0.0370	0.0000	810.3088
Vendor	3.1000e-004	0.0100	2.6500e-003	3.0000e-005	6.8000e-004	2.0000e-005	7.0000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6425	2.6425	1.1000e-004	0.0000	2.6453
Worker	3.2900e-003	2.2300e-003	0.0243	8.0000e-005	9.3800e-003	6.0000e-005	9.4300e-003	2.4900e-003	5.0000e-005	2.5500e-003	0.0000	7.4533	7.4533	1.6000e-004	0.0000	7.4572
Total	**0.0847**	**2.7371**	**0.6565**	**8.4600e-003**	**0.1929**	**7.8200e-003**	**0.2007**	**0.0530**	**7.4800e-003**	**0.0605**	**0.0000**	**819.4797**	**819.4797**	**0.0373**	**0.0000**	**820.4113**

3.10 Alamitos RCA 2.5 CC - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0738	0.7142	0.3968	1.5200e-003		0.0242	0.0242		0.0223	0.0223	0.0000	132.9985	132.9985	0.0425	0.0000	134.0610
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0738**	**0.7142**	**0.3968**	**1.5200e-003**		**0.0242**	**0.0242**		**0.0223**	**0.0223**	**0.0000**	**132.9985**	**132.9985**	**0.0425**	**0.0000**	**134.0610**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1132	3.8034	0.8787	0.0117	0.2552	0.0108	0.2661	0.0702	0.0103	0.0805	0.0000	1,129.7216	1,129.7216	0.0516	0.0000	1,131.0126
Vendor	4.6000e-004	0.0146	3.8600e-003	4.0000e-005	9.9000e-004	3.0000e-005	1.0200e-003	2.9000e-004	3.0000e-005	3.1000e-004	0.0000	3.8483	3.8483	1.6000e-004	0.0000	3.8523
Worker	4.7900e-003	3.2400e-003	0.0354	1.2000e-004	0.0137	8.0000e-005	0.0137	3.6300e-003	8.0000e-005	3.7100e-003	0.0000	10.8543	10.8543	2.3000e-004	0.0000	10.8600
Total	**0.1185**	**3.8212**	**0.9180**	**0.0118**	**0.2699**	**0.0109**	**0.2808**	**0.0741**	**0.0105**	**0.0846**	**0.0000**	**1,144.4242**	**1,144.4242**	**0.0520**	**0.0000**	**1,145.7250**

3.10 Alamitos RCA 2.5 CC - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0182	0.0789	0.6677	1.5200e-003		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	132.9984	132.9984	0.0425	0.0000	134.0608
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0182**	**0.0789**	**0.6677**	**1.5200e-003**		**2.4300e-003**	**2.4300e-003**		**2.4300e-003**	**2.4300e-003**	**0.0000**	**132.9984**	**132.9984**	**0.0425**	**0.0000**	**134.0608**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1132	3.8034	0.8787	0.0117	0.2552	0.0108	0.2661	0.0702	0.0103	0.0805	0.0000	1,129.7216	1,129.7216	0.0516	0.0000	1,131.0126
Vendor	4.6000e-004	0.0146	3.8600e-003	4.0000e-005	9.9000e-004	3.0000e-005	1.0200e-003	2.9000e-004	3.0000e-005	3.1000e-004	0.0000	3.8483	3.8483	1.6000e-004	0.0000	3.8523
Worker	4.7900e-003	3.2400e-003	0.0354	1.2000e-004	0.0137	8.0000e-005	0.0137	3.6300e-003	8.0000e-005	3.7100e-003	0.0000	10.8543	10.8543	2.3000e-004	0.0000	10.8600
Total	**0.1185**	**3.8212**	**0.9180**	**0.0118**	**0.2699**	**0.0109**	**0.2808**	**0.0741**	**0.0105**	**0.0846**	**0.0000**	**1,144.4242**	**1,144.4242**	**0.0520**	**0.0000**	**1,145.7250**

3.11 Transfer PL (to LAPP) - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0487	0.4586	0.2769	9.3000e-004		0.0183	0.0183		0.0168	0.0168	0.0000	80.8944	80.8944	0.0259	0.0000	81.5416
Total	**0.0487**	**0.4586**	**0.2769**	**9.3000e-004**		**0.0183**	**0.0183**		**0.0168**	**0.0168**	**0.0000**	**80.8944**	**80.8944**	**0.0259**	**0.0000**	**81.5416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9300e-003	0.1994	0.0461	6.1000e-004	0.0134	5.7000e-004	0.0140	3.6800e-003	5.4000e-004	4.2200e-003	0.0000	59.2215	59.2215	2.7100e-003	0.0000	59.2892
Vendor	2.4000e-004	7.7700e-003	2.0600e-003	2.0000e-005	5.3000e-004	2.0000e-005	5.4000e-004	1.5000e-004	2.0000e-005	1.7000e-004	0.0000	2.0524	2.0524	9.0000e-005	0.0000	2.0546
Worker	2.5500e-003	1.7300e-003	0.0189	6.0000e-005	7.2800e-003	4.0000e-005	7.3300e-003	1.9400e-003	4.0000e-005	1.9800e-003	0.0000	5.7890	5.7890	1.2000e-004	0.0000	5.7920
Total	**8.7200e-003**	**0.2089**	**0.0670**	**6.9000e-004**	**0.0212**	**6.3000e-004**	**0.0218**	**5.7700e-003**	**6.0000e-004**	**6.3700e-003**	**0.0000**	**67.0629**	**67.0629**	**2.9200e-003**	**0.0000**	**67.1358**

3.11 Transfer PL (to LAPP) - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0116	0.0703	0.4241	9.3000e-004		1.4800e-003	1.4800e-003		1.4800e-003	1.4800e-003	0.0000	80.8943	80.8943	0.0259	0.0000	81.5415
Total	**0.0116**	**0.0703**	**0.4241**	**9.3000e-004**		**1.4800e-003**	**1.4800e-003**		**1.4800e-003**	**1.4800e-003**	**0.0000**	**80.8943**	**80.8943**	**0.0259**	**0.0000**	**81.5415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9300e-003	0.1994	0.0461	6.1000e-004	0.0134	5.7000e-004	0.0140	3.6800e-003	5.4000e-004	4.2200e-003	0.0000	59.2215	59.2215	2.7100e-003	0.0000	59.2892
Vendor	2.4000e-004	7.7700e-003	2.0600e-003	2.0000e-005	5.3000e-004	2.0000e-005	5.4000e-004	1.5000e-004	2.0000e-005	1.7000e-004	0.0000	2.0524	2.0524	9.0000e-005	0.0000	2.0546
Worker	2.5500e-003	1.7300e-003	0.0189	6.0000e-005	7.2800e-003	4.0000e-005	7.3300e-003	1.9400e-003	4.0000e-005	1.9800e-003	0.0000	5.7890	5.7890	1.2000e-004	0.0000	5.7920
Total	**8.7200e-003**	**0.2089**	**0.0670**	**6.9000e-004**	**0.0212**	**6.3000e-004**	**0.0218**	**5.7700e-003**	**6.0000e-004**	**6.3700e-003**	**0.0000**	**67.0629**	**67.0629**	**2.9200e-003**	**0.0000**	**67.1358**

3.12 New Park Area - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0466	0.4447	0.2503	9.5000e-004		0.0151	0.0151		0.0140	0.0140	0.0000	82.1090	82.1090	0.0259	0.0000	82.7572
Total	**0.0466**	**0.4447**	**0.2503**	**9.5000e-004**		**0.0151**	**0.0151**		**0.0140**	**0.0140**	**0.0000**	**82.1090**	**82.1090**	**0.0259**	**0.0000**	**82.7572**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0211	0.7091	0.1638	2.1700e-003	0.0621	2.0100e-003	0.0641	0.0166	1.9300e-003	0.0186	0.0000	210.6127	210.6127	9.6300e-003	0.0000	210.8534
Vendor	2.8000e-004	8.8400e-003	2.3400e-003	2.0000e-005	6.0000e-004	2.0000e-005	6.2000e-004	1.7000e-004	2.0000e-005	1.9000e-004	0.0000	2.3346	2.3346	1.0000e-004	0.0000	2.3371
Worker	2.0300e-003	1.3800e-003	0.0150	5.0000e-005	5.8000e-003	4.0000e-005	5.8300e-003	1.5400e-003	3.0000e-005	1.5700e-003	0.0000	4.6095	4.6095	1.0000e-004	0.0000	4.6119
Total	**0.0234**	**0.7193**	**0.1812**	**2.2400e-003**	**0.0685**	**2.0700e-003**	**0.0705**	**0.0184**	**1.9800e-003**	**0.0203**	**0.0000**	**217.5568**	**217.5568**	**9.8300e-003**	**0.0000**	**217.8023**

3.12 New Park Area - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0111	0.0479	0.4051	9.5000e-004		1.4700e-003	1.4700e-003		1.4700e-003	1.4700e-003	0.0000	82.1089	82.1089	0.0259	0.0000	82.7571
Total	**0.0111**	**0.0479**	**0.4051**	**9.5000e-004**		**1.4700e-003**	**1.4700e-003**		**1.4700e-003**	**1.4700e-003**	**0.0000**	**82.1089**	**82.1089**	**0.0259**	**0.0000**	**82.7571**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0211	0.7091	0.1638	2.1700e-003	0.0621	2.0100e-003	0.0641	0.0166	1.9300e-003	0.0186	0.0000	210.6127	210.6127	9.6300e-003	0.0000	210.8534
Vendor	2.8000e-004	8.8400e-003	2.3400e-003	2.0000e-005	6.0000e-004	2.0000e-005	6.2000e-004	1.7000e-004	2.0000e-005	1.9000e-004	0.0000	2.3346	2.3346	1.0000e-004	0.0000	2.3371
Worker	2.0300e-003	1.3800e-003	0.0150	5.0000e-005	5.8000e-003	4.0000e-005	5.8300e-003	1.5400e-003	3.0000e-005	1.5700e-003	0.0000	4.6095	4.6095	1.0000e-004	0.0000	4.6119
Total	**0.0234**	**0.7193**	**0.1812**	**2.2400e-003**	**0.0685**	**2.0700e-003**	**0.0705**	**0.0184**	**1.9800e-003**	**0.0203**	**0.0000**	**217.5568**	**217.5568**	**9.8300e-003**	**0.0000**	**217.8023**

3.12 New Park Area - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0179	0.1614	0.0999	3.9000e-004		5.5400e-003	5.5400e-003		5.1200e-003	5.1200e-003	0.0000	33.3930	33.3930	0.0106	0.0000	33.6567
Total	**0.0179**	**0.1614**	**0.0999**	**3.9000e-004**		**5.5400e-003**	**5.5400e-003**		**5.1200e-003**	**5.1200e-003**	**0.0000**	**33.3930**	**33.3930**	**0.0106**	**0.0000**	**33.6567**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.8700e-003	0.1912	0.0605	8.5000e-004	0.0550	3.4000e-004	0.0553	0.0141	3.2000e-004	0.0144	0.0000	82.3341	82.3341	3.5100e-003	0.0000	82.4218
Vendor	8.0000e-005	2.7200e-003	8.6000e-004	1.0000e-005	2.4000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.9223	0.9223	3.0000e-005	0.0000	0.9231
Worker	7.7000e-004	5.0000e-004	5.6200e-003	2.0000e-005	2.3600e-003	1.0000e-005	2.3700e-003	6.3000e-004	1.0000e-005	6.4000e-004	0.0000	1.8030	1.8030	4.0000e-005	0.0000	1.8039
Total	**6.7200e-003**	**0.1944**	**0.0670**	**8.8000e-004**	**0.0576**	**3.5000e-004**	**0.0579**	**0.0148**	**3.3000e-004**	**0.0151**	**0.0000**	**85.0593**	**85.0593**	**3.5800e-003**	**0.0000**	**85.1488**

3.12 New Park Area - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.4900e-003	0.0195	0.1647	3.9000e-004		6.0000e-004	6.0000e-004		6.0000e-004	6.0000e-004	0.0000	33.3930	33.3930	0.0106	0.0000	33.6566
Total	**4.4900e-003**	**0.0195**	**0.1647**	**3.9000e-004**		**6.0000e-004**	**6.0000e-004**		**6.0000e-004**	**6.0000e-004**	**0.0000**	**33.3930**	**33.3930**	**0.0106**	**0.0000**	**33.6566**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.8700e-003	0.1912	0.0605	8.5000e-004	0.0550	3.4000e-004	0.0553	0.0141	3.2000e-004	0.0144	0.0000	82.3341	82.3341	3.5100e-003	0.0000	82.4218
Vendor	8.0000e-005	2.7200e-003	8.6000e-004	1.0000e-005	2.4000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.9223	0.9223	3.0000e-005	0.0000	0.9231
Worker	7.7000e-004	5.0000e-004	5.6200e-003	2.0000e-005	2.3600e-003	1.0000e-005	2.3700e-003	6.3000e-004	1.0000e-005	6.4000e-004	0.0000	1.8030	1.8030	4.0000e-005	0.0000	1.8039
Total	**6.7200e-003**	**0.1944**	**0.0670**	**8.8000e-004**	**0.0576**	**3.5000e-004**	**0.0579**	**0.0148**	**3.3000e-004**	**0.0151**	**0.0000**	**85.0593**	**85.0593**	**3.5800e-003**	**0.0000**	**85.1488**

3.13 Alamitos Creek WBSG - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.4400e-003	0.0333	0.0185	7.0000e-005		1.1300e-003	1.1300e-003		1.0400e-003	1.0400e-003	0.0000	6.2066	6.2066	1.9800e-003	0.0000	6.2562
Total	**3.4400e-003**	**0.0333**	**0.0185**	**7.0000e-005**	**1.5900e-003**	**1.1300e-003**	**2.7200e-003**	**1.7000e-004**	**1.0400e-003**	**1.2100e-003**	**0.0000**	**6.2066**	**6.2066**	**1.9800e-003**	**0.0000**	**6.2562**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.1500e-003	0.1395	0.0322	4.3000e-004	9.3600e-003	4.0000e-004	9.7600e-003	2.5800e-003	3.8000e-004	2.9500e-003	0.0000	41.4481	41.4481	1.8900e-003	0.0000	41.4955
Vendor	2.0000e-005	6.8000e-004	1.8000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1796	0.1796	1.0000e-005	0.0000	0.1798
Worker	2.2000e-004	1.5000e-004	1.6500e-003	1.0000e-005	6.4000e-004	0.0000	6.4000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5065	0.5065	1.0000e-005	0.0000	0.5068
Total	**4.3900e-003**	**0.1404**	**0.0341**	**4.4000e-004**	**0.0101**	**4.0000e-004**	**0.0105**	**2.7600e-003**	**3.8000e-004**	**3.1300e-003**	**0.0000**	**42.1343**	**42.1343**	**1.9100e-003**	**0.0000**	**42.1821**

3.13 Alamitos Creek WBSG - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.5000e-004	3.6800e-003	0.0312	7.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	6.2066	6.2066	1.9800e-003	0.0000	6.2562
Total	**8.5000e-004**	**3.6800e-003**	**0.0312**	**7.0000e-005**	**1.5900e-003**	**1.1000e-004**	**1.7000e-003**	**1.7000e-004**	**1.1000e-004**	**2.8000e-004**	**0.0000**	**6.2066**	**6.2066**	**1.9800e-003**	**0.0000**	**6.2562**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.1500e-003	0.1395	0.0322	4.3000e-004	9.3600e-003	4.0000e-004	9.7600e-003	2.5800e-003	3.8000e-004	2.9500e-003	0.0000	41.4481	41.4481	1.8900e-003	0.0000	41.4955
Vendor	2.0000e-005	6.8000e-004	1.8000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1796	0.1796	1.0000e-005	0.0000	0.1798
Worker	2.2000e-004	1.5000e-004	1.6500e-003	1.0000e-005	6.4000e-004	0.0000	6.4000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5065	0.5065	1.0000e-005	0.0000	0.5068
Total	**4.3900e-003**	**0.1404**	**0.0341**	**4.4000e-004**	**0.0101**	**4.0000e-004**	**0.0105**	**2.7600e-003**	**3.8000e-004**	**3.1300e-003**	**0.0000**	**42.1343**	**42.1343**	**1.9100e-003**	**0.0000**	**42.1821**

3.14 Reveg & Landscaping - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2000e-004	4.6300e-003	6.5800e-003	1.0000e-005		2.3000e-004	2.3000e-004		2.2000e-004	2.2000e-004	0.0000	0.9761	0.9761	1.4000e-004	0.0000	0.9796
Total	**5.2000e-004**	**4.6300e-003**	**6.5800e-003**	**1.0000e-005**	**0.0000**	**2.3000e-004**	**2.3000e-004**	**0.0000**	**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.9761**	**0.9761**	**1.4000e-004**	**0.0000**	**0.9796**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-005	2.9000e-004	8.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0770	0.0770	0.0000	0.0000	0.0771
Worker	1.0000e-004	6.0000e-005	7.1000e-004	0.0000	2.7000e-004	0.0000	2.7000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2171	0.2171	0.0000	0.0000	0.2172
Total	**1.1000e-004**	**3.5000e-004**	**7.9000e-004**	**0.0000**	**2.9000e-004**	**0.0000**	**2.9000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.2941**	**0.2941**	**0.0000**	**0.0000**	**0.2943**

3.14 Reveg & Landscaping - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2000e-004	5.3000e-004	7.5000e-003	1.0000e-005		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.9761	0.9761	1.4000e-004	0.0000	0.9796
Total	**1.2000e-004**	**5.3000e-004**	**7.5000e-003**	**1.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.9761**	**0.9761**	**1.4000e-004**	**0.0000**	**0.9796**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-005	2.9000e-004	8.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0770	0.0770	0.0000	0.0000	0.0771
Worker	1.0000e-004	6.0000e-005	7.1000e-004	0.0000	2.7000e-004	0.0000	2.7000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2171	0.2171	0.0000	0.0000	0.2172
Total	**1.1000e-004**	**3.5000e-004**	**7.9000e-004**	**0.0000**	**2.9000e-004**	**0.0000**	**2.9000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.2941**	**0.2941**	**0.0000**	**0.0000**	**0.2943**

3.14 Reveg & Landscaping - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0149	0.1293	0.2015	3.5000e-004		6.1700e-003	6.1700e-003		6.0300e-003	6.0300e-003	0.0000	29.9345	29.9345	4.2300e-003	0.0000	30.0403
Total	**0.0149**	**0.1293**	**0.2015**	**3.5000e-004**	**0.0000**	**6.1700e-003**	**6.1700e-003**	**0.0000**	**6.0300e-003**	**6.0300e-003**	**0.0000**	**29.9345**	**29.9345**	**4.2300e-003**	**0.0000**	**30.0403**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.1000e-004	6.7700e-003	2.1300e-003	2.0000e-005	6.1000e-004	1.0000e-005	6.1000e-004	1.8000e-004	1.0000e-005	1.8000e-004	0.0000	2.2932	2.2932	8.0000e-005	0.0000	2.2953
Worker	2.7500e-003	1.7900e-003	0.0200	7.0000e-005	8.3800e-003	5.0000e-005	8.4300e-003	2.2300e-003	5.0000e-005	2.2700e-003	0.0000	6.4044	6.4044	1.2000e-004	0.0000	6.4075
Total	**2.9600e-003**	**8.5600e-003**	**0.0221**	**9.0000e-005**	**8.9900e-003**	**6.0000e-005**	**9.0400e-003**	**2.4100e-003**	**6.0000e-005**	**2.4500e-003**	**0.0000**	**8.6976**	**8.6976**	**2.0000e-004**	**0.0000**	**8.7028**

3.14 Reveg & Landscaping - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.7300e-003	0.0162	0.2301	3.5000e-004		5.0000e-004	5.0000e-004		5.0000e-004	5.0000e-004	0.0000	29.9345	29.9345	4.2300e-003	0.0000	30.0403
Total	**3.7300e-003**	**0.0162**	**0.2301**	**3.5000e-004**	**0.0000**	**5.0000e-004**	**5.0000e-004**	**0.0000**	**5.0000e-004**	**5.0000e-004**	**0.0000**	**29.9345**	**29.9345**	**4.2300e-003**	**0.0000**	**30.0403**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.1000e-004	6.7700e-003	2.1300e-003	2.0000e-005	6.1000e-004	1.0000e-005	6.1000e-004	1.8000e-004	1.0000e-005	1.8000e-004	0.0000	2.2932	2.2932	8.0000e-005	0.0000	2.2953
Worker	2.7500e-003	1.7900e-003	0.0200	7.0000e-005	8.3800e-003	5.0000e-005	8.4300e-003	2.2300e-003	5.0000e-005	2.2700e-003	0.0000	6.4044	6.4044	1.2000e-004	0.0000	6.4075
Total	**2.9600e-003**	**8.5600e-003**	**0.0221**	**9.0000e-005**	**8.9900e-003**	**6.0000e-005**	**9.0400e-003**	**2.4100e-003**	**6.0000e-005**	**2.4500e-003**	**0.0000**	**8.6976**	**8.6976**	**2.0000e-004**	**0.0000**	**8.7028**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	122.85	1,478.75	1088.10	970,169	970,169
Total	122.85	1,478.75	1,088.10	970,169	970,169

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Unmitigated	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	11.0580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.1600e-003**	**1.1600e-003**	**0.0000**	**0.0000**	**1.2400e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	11.0580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.1600e-003**	**1.1600e-003**	**0.0000**	**0.0000**	**1.2400e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	78.8551	3.5700e-003	7.4000e-004	79.1640
Unmitigated	78.8551	3.5700e-003	7.4000e-004	79.1640

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 77.4463	78.8551	3.5700e-003	7.4000e-004	79.1640
Total		**78.8551**	**3.5700e-003**	**7.4000e-004**	**79.1640**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 77.4463	78.8551	3.5700e-003	7.4000e-004	79.1640
Total		**78.8551**	**3.5700e-003**	**7.4000e-004**	**79.1640**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	1.1347	0.0671	0.0000	2.8112
Unmitigated	1.1347	0.0671	0.0000	2.8112

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	5.59	1.1347	0.0671	0.0000	2.8112
Total		**1.1347**	**0.0671**	**0.0000**	**2.8112**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	5.59	1.1347	0.0671	0.0000	2.8112
Total		**1.1347**	**0.0671**	**0.0000**	**2.8112**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

B.7 CalEEMod Output for Health Risk Assessment

ESA

Almaden Lake - For HRA

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	65.00	Acre	65.00	2,831,400.00	100

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - land use type

Construction Phase - schedule

Off-road Equipment - Equipment assumptions.

Off-road Equipment -

Off-road Equipment - Equipment assumptions.

Off-road Equipment - Equipment assumptions

Off-road Equipment - Equipment assumptions

Off-road Equipment - Equipment assumptions.

Off-road Equipment - equipment assumptions

Off-road Equipment - Equipment assumptions

Off-road Equipment - equipment assumptions

Off-road Equipment - Equipment assumptions.

Off-road Equipment - Equipment assumptions

Off-road Equipment - pipeline construction equipment. Other construction equipment represents butt fusion machine.

Off-road Equipment - Equipment for pipeline construction; other construction equipment represents butt fusion machine.

Off-road Equipment - Equipment assumptions

Trips and VMT - trips values are rounded up to the nearest even whole number; based on cut and fill amounts identified in the Project Description.

Grading -

Construction Off-road Equipment Mitigation - Tier 4 equipment standards for off-road.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Parking	150	0
tblAreaCoating	Area_Nonresidential_Exterior	1415700	0
tblAreaCoating	Area_Nonresidential_Interior	4247100	0
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	16.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	110.00	123.00
tblConstructionPhase	NumDays	1,110.00	299.00
tblConstructionPhase	NumDays	110.00	88.00
tblConstructionPhase	NumDays	110.00	75.00

tblConstructionPhase	NumDays	75.00	103.00
tblConstructionPhase	NumDays	75.00	150.00
tblConstructionPhase	NumDays	1,110.00	128.00
tblConstructionPhase	NumDays	110.00	7.00
tblConstructionPhase	NumDays	40.00	95.00
tblFleetMix	HHD	0.02	0.00
tblFleetMix	LDA	0.61	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.18	0.00
tblFleetMix	LHD1	0.01	0.00
tblFleetMix	LHD2	5.0150e-003	0.00
tblFleetMix	MCY	5.2490e-003	0.00
tblFleetMix	MDV	0.10	0.00
tblFleetMix	MH	7.0400e-004	0.00
tblFleetMix	MHD	0.01	0.00
tblFleetMix	OBUS	2.1770e-003	0.00
tblFleetMix	SBUS	6.3200e-004	0.00
tblFleetMix	UBUS	1.5140e-003	0.00
tblGrading	AcresOfGrading	123.00	41.00
tblGrading	AcresOfGrading	3.50	3.00
tblGrading	MaterialSiltContent	6.90	4.30
tblGrading	MeanVehicleSpeed	7.10	40.00
tblLandUse	Population	0.00	100.00
tblOffRoadEquipment	HorsePower	9.00	100.00
tblOffRoadEquipment	HorsePower	158.00	247.00
tblOffRoadEquipment	HorsePower	158.00	247.00
tblOffRoadEquipment	HorsePower	158.00	247.00

tblOffRoadEquipment	HorsePower	172.00	950.00
tblOffRoadEquipment	HorsePower	172.00	30.00
tblOffRoadEquipment	HorsePower	172.00	30.00
tblOffRoadEquipment	HorsePower	168.00	700.00
tblOffRoadEquipment	HorsePower	84.00	250.00
tblOffRoadEquipment	HorsePower	84.00	300.00
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tblOffRoadEquipment	HorsePower	247.00	255.00
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tblOffRoadEquipment	HorsePower	203.00	247.00
tblOffRoadEquipment	LoadFactor	0.38	0.40
tblOffRoadEquipment	LoadFactor	0.42	0.50
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblTripsAndVMT	HaulingTripLength	20.00	0.20
tblTripsAndVMT	HaulingTripLength	20.00	0.20
tblTripsAndVMT	HaulingTripLength	20.00	0.20
tblTripsAndVMT	HaulingTripLength	20.00	0.20
tblTripsAndVMT	HaulingTripLength	20.00	0.20
tblTripsAndVMT	HaulingTripLength	20.00	0.20
tblTripsAndVMT	HaulingTripLength	20.00	0.20
tblTripsAndVMT	HaulingTripLength	20.00	0.20
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tblTripsAndVMT	HaulingTripLength	20.00	0.20
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tblTripsAndVMT	HaulingTripLength	20.00	0.20

tblTripsAndVMT	HaulingTripNumber	0.00	9,424.00
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tblTripsAndVMT	HaulingTripNumber	0.00	66.00
tblTripsAndVMT	HaulingTripNumber	0.00	23,316.00
tblTripsAndVMT	HaulingTripNumber	0.00	32,544.00
tblTripsAndVMT	HaulingTripNumber	0.00	1,706.00
tblTripsAndVMT	HaulingTripNumber	0.00	8,534.00
tblTripsAndVMT	HaulingTripNumber	0.00	1,194.00
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tblTripsAndVMT	VendorTripLength	7.30	0.20
tblTripsAndVMT	VendorTripLength	7.30	0.20
tblTripsAndVMT	VendorTripLength	7.30	0.20
tblTripsAndVMT	VendorTripLength	7.30	0.20
tblTripsAndVMT	VendorTripLength	7.30	0.20
tblTripsAndVMT	VendorTripLength	7.30	0.20
tblTripsAndVMT	VendorTripLength	7.30	0.20
tblTripsAndVMT	VendorTripLength	7.30	0.20
tblTripsAndVMT	VendorTripLength	7.30	0.20
tblTripsAndVMT	VendorTripLength	7.30	0.20
tblTripsAndVMT	VendorTripLength	7.30	0.20
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tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	464.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00

tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	464.00	2.00
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tblTripsAndVMT	VendorTripNumber	0.00	2.00
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tblTripsAndVMT	WorkerTripNumber	20.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00

tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	1,189.00	0.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.4574	4.6576	2.9834	8.3100e-003	1.0702	0.1825	1.2527	0.3612	0.1718	0.5330	0.0000	735.6163	735.6163	0.1618	0.0000	739.6603
2022	0.8956	11.3531	6.5219	0.0199	0.8748	0.3174	1.1922	0.2336	0.2984	0.5320	0.0000	1,771.5646	1,771.5646	0.4088	0.0000	1,781.7854
2023	0.0888	0.8466	0.9370	1.9500e-003	6.5000e-004	0.0341	0.0348	1.7000e-004	0.0336	0.0337	0.0000	169.8939	169.8939	0.0202	0.0000	170.3994
Maximum	**0.8956**	**11.3531**	**6.5219**	**0.0199**	**1.0702**	**0.3174**	**1.2527**	**0.3612**	**0.2984**	**0.5330**	**0.0000**	**1,771.5646**	**1,771.5646**	**0.4088**	**0.0000**	**1,781.7854**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1008	0.6148	3.7181	8.3100e-003	1.0702	0.0146	1.0848	0.3612	0.0144	0.3756	0.0000	735.6154	735.6154	0.1618	0.0000	739.6595
2022	0.2504	4.3782	8.0314	0.0199	0.8748	0.0261	0.9009	0.2336	0.0260	0.2596	0.0000	1,771.5630	1,771.5630	0.4088	0.0000	1,781.7838
2023	0.0208	0.1817	1.0853	1.9500e-003	6.5000e-004	2.5800e-003	3.2300e-003	1.7000e-004	2.5800e-003	2.7500e-003	0.0000	169.8937	169.8937	0.0202	0.0000	170.3992
Maximum	**0.2504**	**4.3782**	**8.0314**	**0.0199**	**1.0702**	**0.0261**	**1.0848**	**0.3612**	**0.0260**	**0.3756**	**0.0000**	**1,771.5630**	**1,771.5630**	**0.4088**	**0.0000**	**1,781.7838**

Almaden Lake - For HRA - Santa Clara County, Annual

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**74.21**	**69.30**	**-22.91**	**0.00**	**0.00**	**91.90**	**19.79**	**0.00**	**91.47**	**41.94**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
10	**4-24-2021**	**7-23-2021**	0.4079	0.1134
11	**7-24-2021**	**10-23-2021**	2.3570	0.2682
12	**10-24-2021**	**1-23-2022**	3.0941	0.4889
13	**1-24-2022**	**4-23-2022**	2.3631	0.6574
14	**4-24-2022**	**7-23-2022**	4.3610	1.7002
15	**7-24-2022**	**10-23-2022**	3.3085	1.3774
16	**10-24-2022**	**1-23-2023**	1.7284	0.8139
17	**1-24-2023**	**4-23-2023**	0.6107	0.1235
18	**4-24-2023**	**7-23-2023**	0.0853	0.0107
		Highest	4.3610	1.7002

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	1.1347	0.0000	1.1347	0.0671	0.0000	2.8112
Water						0.0000	0.0000		0.0000	0.0000	0.0000	78.8551	78.8551	3.5700e-003	7.4000e-004	79.1640
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**0.3079**	**0.0000**	**0.3079**	**0.0756**	**0.0000**	**0.0756**	**1.1347**	**78.8562**	**79.9909**	**0.0706**	**7.4000e-004**	**81.9765**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	1.1347	0.0000	1.1347	0.0671	0.0000	2.8112
Water						0.0000	0.0000		0.0000	0.0000	0.0000	78.8551	78.8551	3.5700e-003	7.4000e-004	79.1640
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**0.3079**	**0.0000**	**0.3079**	**0.0756**	**0.0000**	**0.0756**	**1.1347**	**78.8562**	**79.9909**	**0.0706**	**7.4000e-004**	**81.9765**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Almaden Lake - For HRA - Santa Clara County, Annual

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Creek Diviersion & KD/CI	Trenching	6/1/2021	8/11/2021	5	52	Creek Diversion & Lake Drainage/Cofferdam
2	Levee Footprint	Grading	8/12/2021	1/31/2022	5	123	Levee Footprint
3	Dewatering	Trenching	8/12/2021	5/10/2023	5	455	Dewatering
4	Working Surface/V & DR	Building Construction	8/12/2021	10/4/2022	5	299	Working Surface/Vegetation & Debris Removal
5	Lake & Levee FA	Grading	12/4/2021	4/6/2022	5	88	Lake & Levee Foundation Area
6	Islands (expanded and new)	Grading	4/6/2022	7/19/2022	5	75	Expanded Existing Island and New Island
7	Transfer PL (from AVPL)	Trenching	4/6/2022	7/26/2022	5	80	Transfer Pipeline from Almaden Valley Pipeline
8	Lake Area 2.5 CC	Paving	4/6/2022	8/26/2022	5	103	Lake Area w/2.5' Clay Cap
9	Alamitos RCA 2.5 CC	Paving	6/1/2022	12/27/2022	5	150	Alamitos Restored Channel Area w/ 2.5' Clay Cap
10	Transfer PL (to LAPP)	Trenching	6/25/2022	10/14/2022	5	80	Transfer Pipeline to Los Alamitos Percolation Pond
11	New Park Area	Building Construction	8/26/2022	2/21/2023	5	128	New Park Area
12	Alamitos Creek WBSG	Grading	10/22/2022	11/1/2022	5	7	Alamitos Creek West Bank Shore Grading
13	Reveg & Landscaping	Site Preparation	12/28/2022	5/9/2023	5	95	Revegetation & Landscaping

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Creek Diviersion & KD/CI	Bore/Drill Rigs	1	8.00	221	0.50
Creek Diviersion & KD/CI	Cranes	1	8.00	231	0.29

Creek Diviersion & KD/CI	Other Construction Equipment	1	8.00	950	0.50
Creek Diviersion & KD/CI	Pumps	2	8.00	250	0.74
Levee Footprint	Cement and Mortar Mixers	1	8.00	100	0.56
Levee Footprint	Graders	2	8.00	187	0.41
Levee Footprint	Off-Highway Trucks	2	8.00	402	0.38
Levee Footprint	Other Material Handling Equipment	1	5.00	700	0.40
Levee Footprint	Plate Compactors	2	8.00	8	0.43
Levee Footprint	Pumps	1	5.00	300	0.74
Levee Footprint	Rubber Tired Dozers	1	8.00	247	0.40
Dewatering	Pumps	1	24.00	100	0.74
Working Surface/V & DR	Excavators	3	8.00	247	0.40
Working Surface/V & DR	Rubber Tired Dozers	2	8.00	255	0.40
Lake & Levee FA	Graders	1	8.00	187	0.41
Lake & Levee FA	Off-Highway Trucks	1	8.00	402	0.38
Lake & Levee FA	Plate Compactors	2	8.00	8	0.43
Islands (expanded and new)	Graders	2	8.00	187	0.41
Islands (expanded and new)	Off-Highway Trucks	2	8.00	402	0.38
Islands (expanded and new)	Plate Compactors	4	8.00	8	0.43
Transfer PL (from AVPL)	Cranes	1	8.00	231	0.29
Transfer PL (from AVPL)	Excavators	1	8.00	247	0.38
Transfer PL (from AVPL)	Other Construction Equipment	1	8.00	30	0.42
Transfer PL (from AVPL)	Plate Compactors	1	8.00	8	0.43
Transfer PL (from AVPL)	Rubber Tired Loaders	1	8.00	247	0.36
Lake Area 2.5 CC	Graders	1	8.00	187	0.41
Lake Area 2.5 CC	Off-Highway Trucks	1	8.00	402	0.38
Lake Area 2.5 CC	Plate Compactors	2	8.00	8	0.43
Alamitos RCA 2.5 CC	Graders	1	8.00	187	0.41

Alamitos RCA 2.5 CC	Off-Highway Trucks	1	8.00	402	0.38
Alamitos RCA 2.5 CC	Plate Compactors	1	8.00	8	0.43
Transfer PL (to LAPP)	Cranes	1	8.00	231	0.29
Transfer PL (to LAPP)	Excavators	1	8.00	247	0.38
Transfer PL (to LAPP)	Other Construction Equipment	1	8.00	30	0.42
Transfer PL (to LAPP)	Plate Compactors	1	8.00	8	0.43
Transfer PL (to LAPP)	Rubber Tired Loaders	1	8.00	247	0.36
New Park Area	Graders	1	8.00	187	0.41
New Park Area	Off-Highway Trucks	1	8.00	402	0.38
New Park Area	Plate Compactors	2	8.00	8	0.43
Alamitos Creek WBSG	Graders	1	8.00	187	0.41
Alamitos Creek WBSG	Off-Highway Trucks	1	8.00	402	0.38
Alamitos Creek WBSG	Plate Compactors	1	8.00	8	0.43
Reveg & Landscaping	Excavators	1	4.00	158	0.38
Reveg & Landscaping	Generator Sets	1	6.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Creek Diviersion & KD/CI	5	0.00	4.00	0.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Levee Footprint	10	0.00	10.00	0.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Dewatering	1	0.00	0.00	0.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Working Surface/V & DP	5	0.00	2.00	0.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Lake & Levee FA	4	0.00	2.00	9,424.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Islands (expanded and new)	8	0.00	2.00	6,250.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Transfer PL (from AVPL)	5	0.00	2.00	66.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Lake Area 2.5 CC	4	0.00	2.00	23,316.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Alamitos RCA 2.5 CC	3	0.00	2.00	32,544.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Transfer PL (to LAPP)	5	0.00	2.00	1,706.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
New Park Area	4	0.00	2.00	8,534.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Alamitos Creek WBSG	3	0.00	2.00	1,194.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Reveg & Landscaping	2	0.00	2.00	0.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Creek Diviersion & KD/CI - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0509	0.5031	0.2804	1.4100e-003		0.0163	0.0163		0.0157	0.0157	0.0000	122.1641	122.1641	0.0138	0.0000	122.5100
Total	**0.0509**	**0.5031**	**0.2804**	**1.4100e-003**		**0.0163**	**0.0163**		**0.0157**	**0.0157**	**0.0000**	**122.1641**	**122.1641**	**0.0138**	**0.0000**	**122.5100**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	6.0900e-003	1.6500e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5899	0.5899	7.0000e-005	0.0000	0.5916
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5000e-004**	**6.0900e-003**	**1.6500e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.5899**	**0.5899**	**7.0000e-005**	**0.0000**	**0.5916**

3.2 Creek Diviersion & KD/CI - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0187	0.1307	0.4948	1.4100e-003		3.9900e-003	3.9900e-003		3.7900e-003	3.7900e-003	0.0000	122.1639	122.1639	0.0138	0.0000	122.5099
Total	**0.0187**	**0.1307**	**0.4948**	**1.4100e-003**		**3.9900e-003**	**3.9900e-003**		**3.7900e-003**	**3.7900e-003**	**0.0000**	**122.1639**	**122.1639**	**0.0138**	**0.0000**	**122.5099**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	6.0900e-003	1.6500e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5899	0.5899	7.0000e-005	0.0000	0.5916
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5000e-004**	**6.0900e-003**	**1.6500e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.5899**	**0.5899**	**7.0000e-005**	**0.0000**	**0.5916**

3.3 Levee Footprint - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3289	0.0000	0.3289	0.1712	0.0000	0.1712	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1891	1.9240	0.9010	3.1300e-003		0.0732	0.0732		0.0680	0.0680	0.0000	283.4941	283.4941	0.0721	0.0000	285.2967
Total	**0.1891**	**1.9240**	**0.9010**	**3.1300e-003**	**0.3289**	**0.0732**	**0.4021**	**0.1712**	**0.0680**	**0.2391**	**0.0000**	**283.4941**	**283.4941**	**0.0721**	**0.0000**	**285.2967**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.6000e-004	0.0299	8.0700e-003	3.0000e-005	1.0000e-004	2.0000e-005	1.2000e-004	3.0000e-005	2.0000e-005	5.0000e-005	0.0000	2.8925	2.8925	3.5000e-004	0.0000	2.9013
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.6000e-004**	**0.0299**	**8.0700e-003**	**3.0000e-005**	**1.0000e-004**	**2.0000e-005**	**1.2000e-004**	**3.0000e-005**	**2.0000e-005**	**5.0000e-005**	**0.0000**	**2.8925**	**2.8925**	**3.5000e-004**	**0.0000**	**2.9013**

3.3 Levee Footprint - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3289	0.0000	0.3289	0.1712	0.0000	0.1712	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0376	0.1629	1.3781	3.1300e-003		5.0100e-003	5.0100e-003		5.0100e-003	5.0100e-003	0.0000	283.4938	283.4938	0.0721	0.0000	285.2964
Total	**0.0376**	**0.1629**	**1.3781**	**3.1300e-003**	**0.3289**	**5.0100e-003**	**0.3339**	**0.1712**	**5.0100e-003**	**0.1762**	**0.0000**	**283.4938**	**283.4938**	**0.0721**	**0.0000**	**285.2964**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.6000e-004	0.0299	8.0700e-003	3.0000e-005	1.0000e-004	2.0000e-005	1.2000e-004	3.0000e-005	2.0000e-005	5.0000e-005	0.0000	2.8925	2.8925	3.5000e-004	0.0000	2.9013
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.6000e-004**	**0.0299**	**8.0700e-003**	**3.0000e-005**	**1.0000e-004**	**2.0000e-005**	**1.2000e-004**	**3.0000e-005**	**2.0000e-005**	**5.0000e-005**	**0.0000**	**2.8925**	**2.8925**	**3.5000e-004**	**0.0000**	**2.9013**

3.3 Levee Footprint - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0850	0.0000	0.0850	0.0371	0.0000	0.0371	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0341	0.3284	0.1744	6.4000e-004		0.0123	0.0123		0.0114	0.0114	0.0000	58.3645	58.3645	0.0148	0.0000	58.7351
Total	**0.0341**	**0.3284**	**0.1744**	**6.4000e-004**	**0.0850**	**0.0123**	**0.0973**	**0.0371**	**0.0114**	**0.0485**	**0.0000**	**58.3645**	**58.3645**	**0.0148**	**0.0000**	**58.7351**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.4000e-004	5.9800e-003	1.5500e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5903	0.5903	7.0000e-005	0.0000	0.5920
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4000e-004**	**5.9800e-003**	**1.5500e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.5903**	**0.5903**	**7.0000e-005**	**0.0000**	**0.5920**

3.3 Levee Footprint - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0850	0.0000	0.0850	0.0371	0.0000	0.0371	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.7400e-003	0.0335	0.2837	6.4000e-004		1.0300e-003	1.0300e-003		1.0300e-003	1.0300e-003	0.0000	58.3645	58.3645	0.0148	0.0000	58.7350
Total	**7.7400e-003**	**0.0335**	**0.2837**	**6.4000e-004**	**0.0850**	**1.0300e-003**	**0.0860**	**0.0371**	**1.0300e-003**	**0.0381**	**0.0000**	**58.3645**	**58.3645**	**0.0148**	**0.0000**	**58.7350**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.4000e-004	5.9800e-003	1.5500e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5903	0.5903	7.0000e-005	0.0000	0.5920
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4000e-004**	**5.9800e-003**	**1.5500e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.5903**	**0.5903**	**7.0000e-005**	**0.0000**	**0.5920**

3.4 Dewatering - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0693	0.5847	0.6813	1.2000e-003		0.0324	0.0324		0.0324	0.0324	0.0000	102.9487	102.9487	5.6200e-003	0.0000	103.0891
Total	**0.0693**	**0.5847**	**0.6813**	**1.2000e-003**		**0.0324**	**0.0324**		**0.0324**	**0.0324**	**0.0000**	**102.9487**	**102.9487**	**5.6200e-003**	**0.0000**	**103.0891**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Dewatering - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0120	0.0519	0.7388	1.2000e-003		1.6000e-003	1.6000e-003		1.6000e-003	1.6000e-003	0.0000	102.9486	102.9486	5.6200e-003	0.0000	103.0890
Total	**0.0120**	**0.0519**	**0.7388**	**1.2000e-003**		**1.6000e-003**	**1.6000e-003**		**1.6000e-003**	**1.6000e-003**	**0.0000**	**102.9486**	**102.9486**	**5.6200e-003**	**0.0000**	**103.0890**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Dewatering - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1634	1.3784	1.7327	3.0500e-003		0.0723	0.0723		0.0723	0.0723	0.0000	262.4178	262.4178	0.0134	0.0000	262.7525
Total	**0.1634**	**1.3784**	**1.7327**	**3.0500e-003**		**0.0723**	**0.0723**		**0.0723**	**0.0723**	**0.0000**	**262.4178**	**262.4178**	**0.0134**	**0.0000**	**262.7525**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Dewatering - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0305	0.1323	1.8833	3.0500e-003		4.0700e-003	4.0700e-003		4.0700e-003	4.0700e-003	0.0000	262.4174	262.4174	0.0134	0.0000	262.7522
Total	**0.0305**	**0.1323**	**1.8833**	**3.0500e-003**		**4.0700e-003**	**4.0700e-003**		**4.0700e-003**	**4.0700e-003**	**0.0000**	**262.4174**	**262.4174**	**0.0134**	**0.0000**	**262.7522**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Dewatering - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0544	0.4572	0.6187	1.0900e-003		0.0224	0.0224		0.0224	0.0224	0.0000	93.8648	93.8648	4.2900e-003	0.0000	93.9722
Total	**0.0544**	**0.4572**	**0.6187**	**1.0900e-003**		**0.0224**	**0.0224**		**0.0224**	**0.0224**	**0.0000**	**93.8648**	**93.8648**	**4.2900e-003**	**0.0000**	**93.9722**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Dewatering - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0109	0.0473	0.6737	1.0900e-003		1.4600e-003	1.4600e-003		1.4600e-003	1.4600e-003	0.0000	93.8647	93.8647	4.2900e-003	0.0000	93.9721
Total	**0.0109**	**0.0473**	**0.6737**	**1.0900e-003**		**1.4600e-003**	**1.4600e-003**		**1.4600e-003**	**1.4600e-003**	**0.0000**	**93.8647**	**93.8647**	**4.2900e-003**	**0.0000**	**93.9721**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.5 Working Surface/V & DR - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1337	1.3871	1.0357	2.2100e-003		0.0565	0.0565		0.0520	0.0520	0.0000	193.8431	193.8431	0.0627	0.0000	195.4104
Total	**0.1337**	**1.3871**	**1.0357**	**2.2100e-003**		**0.0565**	**0.0565**		**0.0520**	**0.0520**	**0.0000**	**193.8431**	**193.8431**	**0.0627**	**0.0000**	**195.4104**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	5.9800e-003	1.6100e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5785	0.5785	7.0000e-005	0.0000	0.5803
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5000e-004**	**5.9800e-003**	**1.6100e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.5785**	**0.5785**	**7.0000e-005**	**0.0000**	**0.5803**

3.5 Working Surface/V & DR - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0270	0.1170	0.9902	2.2100e-003		3.6000e-003	3.6000e-003		3.6000e-003	3.6000e-003	0.0000	193.8428	193.8428	0.0627	0.0000	195.4102
Total	**0.0270**	**0.1170**	**0.9902**	**2.2100e-003**		**3.6000e-003**	**3.6000e-003**		**3.6000e-003**	**3.6000e-003**	**0.0000**	**193.8428**	**193.8428**	**0.0627**	**0.0000**	**195.4102**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	5.9800e-003	1.6100e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5785	0.5785	7.0000e-005	0.0000	0.5803
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5000e-004**	**5.9800e-003**	**1.6100e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.5785**	**0.5785**	**7.0000e-005**	**0.0000**	**0.5803**

3.5 Working Surface/V & DR - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2447	2.4176	1.9424	4.2600e-003		0.1004	0.1004		0.0923	0.0923	0.0000	374.6032	374.6032	0.1212	0.0000	377.6321
Total	**0.2447**	**2.4176**	**1.9424**	**4.2600e-003**		**0.1004**	**0.1004**		**0.0923**	**0.0923**	**0.0000**	**374.6032**	**374.6032**	**0.1212**	**0.0000**	**377.6321**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.7000e-004	0.0112	2.9000e-003	1.0000e-005	4.0000e-005	1.0000e-005	5.0000e-005	1.0000e-005	1.0000e-005	2.0000e-005	0.0000	1.1075	1.1075	1.3000e-004	0.0000	1.1107
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.7000e-004**	**0.0112**	**2.9000e-003**	**1.0000e-005**	**4.0000e-005**	**1.0000e-005**	**5.0000e-005**	**1.0000e-005**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**1.1075**	**1.1075**	**1.3000e-004**	**0.0000**	**1.1107**

3.5 Working Surface/V & DR - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0522	0.2260	1.9125	4.2600e-003		6.9500e-003	6.9500e-003		6.9500e-003	6.9500e-003	0.0000	374.6028	374.6028	0.1212	0.0000	377.6316
Total	**0.0522**	**0.2260**	**1.9125**	**4.2600e-003**		**6.9500e-003**	**6.9500e-003**		**6.9500e-003**	**6.9500e-003**	**0.0000**	**374.6028**	**374.6028**	**0.1212**	**0.0000**	**377.6316**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.7000e-004	0.0112	2.9000e-003	1.0000e-005	4.0000e-005	1.0000e-005	5.0000e-005	1.0000e-005	1.0000e-005	2.0000e-005	0.0000	1.1075	1.1075	1.3000e-004	0.0000	1.1107
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.7000e-004**	**0.0112**	**2.9000e-003**	**1.0000e-005**	**4.0000e-005**	**1.0000e-005**	**5.0000e-005**	**1.0000e-005**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**1.1075**	**1.1075**	**1.3000e-004**	**0.0000**	**1.1107**

3.6 Lake & Levee FA - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0114	0.1169	0.0579	2.1000e-004		4.0000e-003	4.0000e-003		3.7000e-003	3.7000e-003	0.0000	18.0454	18.0454	5.7000e-003	0.0000	18.1879
Total	**0.0114**	**0.1169**	**0.0579**	**2.1000e-004**	**0.7405**	**4.0000e-003**	**0.7445**	**0.1898**	**3.7000e-003**	**0.1935**	**0.0000**	**18.0454**	**18.0454**	**5.7000e-003**	**0.0000**	**18.1879**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.9200e-003	0.0987	0.0155	1.1000e-004	6.7000e-004	6.0000e-005	7.2000e-004	1.7000e-004	6.0000e-005	2.3000e-004	0.0000	10.9466	10.9466	1.3100e-003	0.0000	10.9793
Vendor	3.0000e-005	1.1700e-003	3.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1134	0.1134	1.0000e-005	0.0000	0.1138
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.9500e-003**	**0.0998**	**0.0158**	**1.1000e-004**	**6.7000e-004**	**6.0000e-005**	**7.2000e-004**	**1.7000e-004**	**6.0000e-005**	**2.3000e-004**	**0.0000**	**11.0600**	**11.0600**	**1.3200e-003**	**0.0000**	**11.0931**

3.6 Lake & Levee FA - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.4300e-003	0.0105	0.0890	2.1000e-004		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	18.0454	18.0454	5.7000e-003	0.0000	18.1879
Total	**2.4300e-003**	**0.0105**	**0.0890**	**2.1000e-004**	**0.7405**	**3.2000e-004**	**0.7408**	**0.1898**	**3.2000e-004**	**0.1901**	**0.0000**	**18.0454**	**18.0454**	**5.7000e-003**	**0.0000**	**18.1879**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.9200e-003	0.0987	0.0155	1.1000e-004	6.7000e-004	6.0000e-005	7.2000e-004	1.7000e-004	6.0000e-005	2.3000e-004	0.0000	10.9466	10.9466	1.3100e-003	0.0000	10.9793
Vendor	3.0000e-005	1.1700e-003	3.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1134	0.1134	1.0000e-005	0.0000	0.1138
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.9500e-003**	**0.0998**	**0.0158**	**1.1000e-004**	**6.7000e-004**	**6.0000e-005**	**7.2000e-004**	**1.7000e-004**	**6.0000e-005**	**2.3000e-004**	**0.0000**	**11.0600**	**11.0600**	**1.3200e-003**	**0.0000**	**11.0931**

3.6 Lake & Levee FA - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0348	0.3323	0.1871	7.1000e-004		0.0113	0.0113		0.0105	0.0105	0.0000	61.3562	61.3562	0.0194	0.0000	61.8406
Total	**0.0348**	**0.3323**	**0.1871**	**7.1000e-004**	**0.7405**	**0.0113**	**0.7518**	**0.1898**	**0.0105**	**0.2003**	**0.0000**	**61.3562**	**61.3562**	**0.0194**	**0.0000**	**61.8406**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.1400e-003	0.3242	0.0510	3.8000e-004	8.3000e-004	1.7000e-004	1.0000e-003	2.3000e-004	1.6000e-004	3.9000e-004	0.0000	36.8701	36.8701	4.1800e-003	0.0000	36.9747
Vendor	9.0000e-005	3.8700e-003	1.0000e-003	0.0000	1.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.3823	0.3823	4.0000e-005	0.0000	0.3834
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.2300e-003**	**0.3281**	**0.0520**	**3.8000e-004**	**8.4000e-004**	**1.7000e-004**	**1.0200e-003**	**2.3000e-004**	**1.6000e-004**	**4.0000e-004**	**0.0000**	**37.2524**	**37.2524**	**4.2200e-003**	**0.0000**	**37.3580**

3.6 Lake & Levee FA - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.2500e-003	0.0358	0.3027	7.1000e-004		1.1000e-003	1.1000e-003		1.1000e-003	1.1000e-003	0.0000	61.3561	61.3561	0.0194	0.0000	61.8405
Total	**8.2500e-003**	**0.0358**	**0.3027**	**7.1000e-004**	**0.7405**	**1.1000e-003**	**0.7416**	**0.1898**	**1.1000e-003**	**0.1909**	**0.0000**	**61.3561**	**61.3561**	**0.0194**	**0.0000**	**61.8405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.1400e-003	0.3242	0.0510	3.8000e-004	8.3000e-004	1.7000e-004	1.0000e-003	2.3000e-004	1.6000e-004	3.9000e-004	0.0000	36.8701	36.8701	4.1800e-003	0.0000	36.9747
Vendor	9.0000e-005	3.8700e-003	1.0000e-003	0.0000	1.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.3823	0.3823	4.0000e-005	0.0000	0.3834
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.2300e-003**	**0.3281**	**0.0520**	**3.8000e-004**	**8.4000e-004**	**1.7000e-004**	**1.0200e-003**	**2.3000e-004**	**1.6000e-004**	**4.0000e-004**	**0.0000**	**37.2524**	**37.2524**	**4.2200e-003**	**0.0000**	**37.3580**

3.7 Islands (expanded and new) - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0398	0.0000	0.0398	4.2900e-003	0.0000	4.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0768	0.7330	0.4126	1.5600e-003		0.0250	0.0250		0.0231	0.0231	0.0000	135.3445	135.3445	0.0427	0.0000	136.4130
Total	**0.0768**	**0.7330**	**0.4126**	**1.5600e-003**	**0.0398**	**0.0250**	**0.0647**	**4.2900e-003**	**0.0231**	**0.0274**	**0.0000**	**135.3445**	**135.3445**	**0.0427**	**0.0000**	**136.4130**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.2700e-003	0.2782	0.0438	3.3000e-004	6.0000e-004	1.4000e-004	7.4000e-004	1.7000e-004	1.4000e-004	3.1000e-004	0.0000	31.6441	31.6441	3.5900e-003	0.0000	31.7338
Vendor	1.0000e-004	4.2700e-003	1.1000e-003	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.4217	0.4217	5.0000e-005	0.0000	0.4229
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.3700e-003**	**0.2825**	**0.0449**	**3.3000e-004**	**6.2000e-004**	**1.4000e-004**	**7.6000e-004**	**1.7000e-004**	**1.4000e-004**	**3.2000e-004**	**0.0000**	**32.0657**	**32.0657**	**3.6400e-003**	**0.0000**	**32.1567**

3.7 Islands (expanded and new) - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0398	0.0000	0.0398	4.2900e-003	0.0000	4.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0182	0.0789	0.6677	1.5600e-003		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	135.3443	135.3443	0.0427	0.0000	136.4129
Total	**0.0182**	**0.0789**	**0.6677**	**1.5600e-003**	**0.0398**	**2.4300e-003**	**0.0422**	**4.2900e-003**	**2.4300e-003**	**6.7200e-003**	**0.0000**	**135.3443**	**135.3443**	**0.0427**	**0.0000**	**136.4129**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.2700e-003	0.2782	0.0438	3.3000e-004	6.0000e-004	1.4000e-004	7.4000e-004	1.7000e-004	1.4000e-004	3.1000e-004	0.0000	31.6441	31.6441	3.5900e-003	0.0000	31.7338
Vendor	1.0000e-004	4.2700e-003	1.1000e-003	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.4217	0.4217	5.0000e-005	0.0000	0.4229
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.3700e-003**	**0.2825**	**0.0449**	**3.3000e-004**	**6.2000e-004**	**1.4000e-004**	**7.6000e-004**	**1.7000e-004**	**1.4000e-004**	**3.2000e-004**	**0.0000**	**32.0657**	**32.0657**	**3.6400e-003**	**0.0000**	**32.1567**

3.8 Transfer PL (from AVPL) - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0487	0.4586	0.2769	9.3000e-004		0.0183	0.0183		0.0168	0.0168	0.0000	80.8944	80.8944	0.0259	0.0000	81.5416
Total	**0.0487**	**0.4586**	**0.2769**	**9.3000e-004**		**0.0183**	**0.0183**		**0.0168**	**0.0168**	**0.0000**	**80.8944**	**80.8944**	**0.0259**	**0.0000**	**81.5416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	2.9400e-003	4.6000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.3342	0.3342	4.0000e-005	0.0000	0.3351
Vendor	1.1000e-004	4.5600e-003	1.1800e-003	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.4498	0.4498	5.0000e-005	0.0000	0.4511
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.7000e-004**	**7.5000e-003**	**1.6400e-003**	**0.0000**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.7839**	**0.7839**	**9.0000e-005**	**0.0000**	**0.7862**

3.8 Transfer PL (from AVPL) - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0116	0.0703	0.4241	9.3000e-004		1.4800e-003	1.4800e-003		1.4800e-003	1.4800e-003	0.0000	80.8943	80.8943	0.0259	0.0000	81.5415
Total	**0.0116**	**0.0703**	**0.4241**	**9.3000e-004**		**1.4800e-003**	**1.4800e-003**		**1.4800e-003**	**1.4800e-003**	**0.0000**	**80.8943**	**80.8943**	**0.0259**	**0.0000**	**81.5415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	2.9400e-003	4.6000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.3342	0.3342	4.0000e-005	0.0000	0.3351
Vendor	1.1000e-004	4.5600e-003	1.1800e-003	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.4498	0.4498	5.0000e-005	0.0000	0.4511
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.7000e-004**	**7.5000e-003**	**1.6400e-003**	**0.0000**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.7839**	**0.7839**	**9.0000e-005**	**0.0000**	**0.7862**

3.9 Lake Area 2.5 CC - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0527	0.5034	0.2833	1.0700e-003		0.0171	0.0171		0.0158	0.0158	0.0000	92.9365	92.9365	0.0294	0.0000	93.6703
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0527**	**0.5034**	**0.2833**	**1.0700e-003**		**0.0171**	**0.0171**		**0.0158**	**0.0158**	**0.0000**	**92.9365**	**92.9365**	**0.0294**	**0.0000**	**93.6703**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0197	1.0380	0.1633	1.2200e-003	2.2200e-003	5.3000e-004	2.7500e-003	6.3000e-004	5.1000e-004	1.1400e-003	0.0000	118.0502	118.0502	0.0134	0.0000	118.3850
Vendor	1.4000e-004	5.8700e-003	1.5200e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5791	0.5791	7.0000e-005	0.0000	0.5807
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0198**	**1.0438**	**0.1648**	**1.2300e-003**	**2.2400e-003**	**5.3000e-004**	**2.7700e-003**	**6.4000e-004**	**5.1000e-004**	**1.1500e-003**	**0.0000**	**118.6292**	**118.6292**	**0.0135**	**0.0000**	**118.9657**

3.9 Lake Area 2.5 CC - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0125	0.0542	0.4585	1.0700e-003		1.6700e-003	1.6700e-003		1.6700e-003	1.6700e-003	0.0000	92.9364	92.9364	0.0294	0.0000	93.6702
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0125**	**0.0542**	**0.4585**	**1.0700e-003**		**1.6700e-003**	**1.6700e-003**		**1.6700e-003**	**1.6700e-003**	**0.0000**	**92.9364**	**92.9364**	**0.0294**	**0.0000**	**93.6702**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0197	1.0380	0.1633	1.2200e-003	2.2200e-003	5.3000e-004	2.7500e-003	6.3000e-004	5.1000e-004	1.1400e-003	0.0000	118.0502	118.0502	0.0134	0.0000	118.3850
Vendor	1.4000e-004	5.8700e-003	1.5200e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5791	0.5791	7.0000e-005	0.0000	0.5807
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0198**	**1.0438**	**0.1648**	**1.2300e-003**	**2.2400e-003**	**5.3000e-004**	**2.7700e-003**	**6.4000e-004**	**5.1000e-004**	**1.1500e-003**	**0.0000**	**118.6292**	**118.6292**	**0.0135**	**0.0000**	**118.9657**

3.10 Alamitos RCA 2.5 CC - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0738	0.7142	0.3968	1.5200e-003		0.0242	0.0242		0.0223	0.0223	0.0000	132.9985	132.9985	0.0425	0.0000	134.0610
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0738**	**0.7142**	**0.3968**	**1.5200e-003**		**0.0242**	**0.0242**		**0.0223**	**0.0223**	**0.0000**	**132.9985**	**132.9985**	**0.0425**	**0.0000**	**134.0610**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0274	1.4488	0.2280	1.7000e-003	3.1000e-003	7.4000e-004	3.8400e-003	8.8000e-004	7.1000e-004	1.5900e-003	0.0000	164.7720	164.7720	0.0187	0.0000	165.2393
Vendor	2.1000e-004	8.5500e-003	2.2100e-003	1.0000e-005	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.8433	0.8433	1.0000e-004	0.0000	0.8457
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0277**	**1.4573**	**0.2302**	**1.7100e-003**	**3.1300e-003**	**7.4000e-004**	**3.8700e-003**	**8.9000e-004**	**7.1000e-004**	**1.6000e-003**	**0.0000**	**165.6153**	**165.6153**	**0.0188**	**0.0000**	**166.0851**

3.10 Alamitos RCA 2.5 CC - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0182	0.0789	0.6677	1.5200e-003		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	132.9984	132.9984	0.0425	0.0000	134.0608
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0182**	**0.0789**	**0.6677**	**1.5200e-003**		**2.4300e-003**	**2.4300e-003**		**2.4300e-003**	**2.4300e-003**	**0.0000**	**132.9984**	**132.9984**	**0.0425**	**0.0000**	**134.0608**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0274	1.4488	0.2280	1.7000e-003	3.1000e-003	7.4000e-004	3.8400e-003	8.8000e-004	7.1000e-004	1.5900e-003	0.0000	164.7720	164.7720	0.0187	0.0000	165.2393
Vendor	2.1000e-004	8.5500e-003	2.2100e-003	1.0000e-005	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.8433	0.8433	1.0000e-004	0.0000	0.8457
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0277**	**1.4573**	**0.2302**	**1.7100e-003**	**3.1300e-003**	**7.4000e-004**	**3.8700e-003**	**8.9000e-004**	**7.1000e-004**	**1.6000e-003**	**0.0000**	**165.6153**	**165.6153**	**0.0188**	**0.0000**	**166.0851**

3.11 Transfer PL (to LAPP) - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0487	0.4586	0.2769	9.3000e-004		0.0183	0.0183		0.0168	0.0168	0.0000	80.8944	80.8944	0.0259	0.0000	81.5416
Total	**0.0487**	**0.4586**	**0.2769**	**9.3000e-004**		**0.0183**	**0.0183**		**0.0168**	**0.0168**	**0.0000**	**80.8944**	**80.8944**	**0.0259**	**0.0000**	**81.5416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4400e-003	0.0760	0.0120	9.0000e-005	1.6000e-004	4.0000e-005	2.0000e-004	5.0000e-005	4.0000e-005	8.0000e-005	0.0000	8.6376	8.6376	9.8000e-004	0.0000	8.6621
Vendor	1.1000e-004	4.5600e-003	1.1800e-003	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.4498	0.4498	5.0000e-005	0.0000	0.4511
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5500e-003**	**0.0805**	**0.0131**	**9.0000e-005**	**1.8000e-004**	**4.0000e-005**	**2.2000e-004**	**5.0000e-005**	**4.0000e-005**	**9.0000e-005**	**0.0000**	**9.0873**	**9.0873**	**1.0300e-003**	**0.0000**	**9.1131**

3.11 Transfer PL (to LAPP) - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0116	0.0703	0.4241	9.3000e-004		1.4800e-003	1.4800e-003		1.4800e-003	1.4800e-003	0.0000	80.8943	80.8943	0.0259	0.0000	81.5415
Total	**0.0116**	**0.0703**	**0.4241**	**9.3000e-004**		**1.4800e-003**	**1.4800e-003**		**1.4800e-003**	**1.4800e-003**	**0.0000**	**80.8943**	**80.8943**	**0.0259**	**0.0000**	**81.5415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4400e-003	0.0760	0.0120	9.0000e-005	1.6000e-004	4.0000e-005	2.0000e-004	5.0000e-005	4.0000e-005	8.0000e-005	0.0000	8.6376	8.6376	9.8000e-004	0.0000	8.6621
Vendor	1.1000e-004	4.5600e-003	1.1800e-003	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.4498	0.4498	5.0000e-005	0.0000	0.4511
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5500e-003**	**0.0805**	**0.0131**	**9.0000e-005**	**1.8000e-004**	**4.0000e-005**	**2.2000e-004**	**5.0000e-005**	**4.0000e-005**	**9.0000e-005**	**0.0000**	**9.0873**	**9.0873**	**1.0300e-003**	**0.0000**	**9.1131**

3.12 New Park Area - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0466	0.4447	0.2503	9.5000e-004		0.0151	0.0151		0.0140	0.0140	0.0000	82.1090	82.1090	0.0259	0.0000	82.7572
Total	**0.0466**	**0.4447**	**0.2503**	**9.5000e-004**		**0.0151**	**0.0151**		**0.0140**	**0.0140**	**0.0000**	**82.1090**	**82.1090**	**0.0259**	**0.0000**	**82.7572**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.1200e-003	0.2701	0.0425	3.2000e-004	7.3000e-004	1.4000e-004	8.7000e-004	2.0000e-004	1.3000e-004	3.4000e-004	0.0000	30.7183	30.7183	3.4800e-003	0.0000	30.8054
Vendor	1.2000e-004	5.1900e-003	1.3400e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5116	0.5116	6.0000e-005	0.0000	0.5131
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.2400e-003**	**0.2753**	**0.0438**	**3.3000e-004**	**7.5000e-004**	**1.4000e-004**	**8.9000e-004**	**2.1000e-004**	**1.3000e-004**	**3.5000e-004**	**0.0000**	**31.2299**	**31.2299**	**3.5400e-003**	**0.0000**	**31.3185**

3.12 New Park Area - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0111	0.0479	0.4051	9.5000e-004		1.4700e-003	1.4700e-003		1.4700e-003	1.4700e-003	0.0000	82.1089	82.1089	0.0259	0.0000	82.7571
Total	**0.0111**	**0.0479**	**0.4051**	**9.5000e-004**		**1.4700e-003**	**1.4700e-003**		**1.4700e-003**	**1.4700e-003**	**0.0000**	**82.1089**	**82.1089**	**0.0259**	**0.0000**	**82.7571**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.1200e-003	0.2701	0.0425	3.2000e-004	7.3000e-004	1.4000e-004	8.7000e-004	2.0000e-004	1.3000e-004	3.4000e-004	0.0000	30.7183	30.7183	3.4800e-003	0.0000	30.8054
Vendor	1.2000e-004	5.1900e-003	1.3400e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5116	0.5116	6.0000e-005	0.0000	0.5131
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.2400e-003**	**0.2753**	**0.0438**	**3.3000e-004**	**7.5000e-004**	**1.4000e-004**	**8.9000e-004**	**2.1000e-004**	**1.3000e-004**	**3.5000e-004**	**0.0000**	**31.2299**	**31.2299**	**3.5400e-003**	**0.0000**	**31.3185**

3.12 New Park Area - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0179	0.1614	0.0999	3.9000e-004		5.5400e-003	5.5400e-003		5.1200e-003	5.1200e-003	0.0000	33.3930	33.3930	0.0106	0.0000	33.6567
Total	**0.0179**	**0.1614**	**0.0999**	**3.9000e-004**		**5.5400e-003**	**5.5400e-003**		**5.1200e-003**	**5.1200e-003**	**0.0000**	**33.3930**	**33.3930**	**0.0106**	**0.0000**	**33.6567**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4700e-003	0.0924	0.0152	1.2000e-004	6.2000e-004	3.0000e-005	6.5000e-004	1.6000e-004	3.0000e-005	1.9000e-004	0.0000	12.0028	12.0028	1.0800e-003	0.0000	12.0299
Vendor	4.0000e-005	1.8300e-003	4.9000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.2004	0.2004	2.0000e-005	0.0000	0.2009
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5100e-003**	**0.0942**	**0.0157**	**1.2000e-004**	**6.3000e-004**	**3.0000e-005**	**6.6000e-004**	**1.6000e-004**	**3.0000e-005**	**1.9000e-004**	**0.0000**	**12.2032**	**12.2032**	**1.1000e-003**	**0.0000**	**12.2308**

3.12 New Park Area - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.4900e-003	0.0195	0.1647	3.9000e-004		6.0000e-004	6.0000e-004		6.0000e-004	6.0000e-004	0.0000	33.3930	33.3930	0.0106	0.0000	33.6566
Total	**4.4900e-003**	**0.0195**	**0.1647**	**3.9000e-004**		**6.0000e-004**	**6.0000e-004**		**6.0000e-004**	**6.0000e-004**	**0.0000**	**33.3930**	**33.3930**	**0.0106**	**0.0000**	**33.6566**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4700e-003	0.0924	0.0152	1.2000e-004	6.2000e-004	3.0000e-005	6.5000e-004	1.6000e-004	3.0000e-005	1.9000e-004	0.0000	12.0028	12.0028	1.0800e-003	0.0000	12.0299
Vendor	4.0000e-005	1.8300e-003	4.9000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.2004	0.2004	2.0000e-005	0.0000	0.2009
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5100e-003**	**0.0942**	**0.0157**	**1.2000e-004**	**6.3000e-004**	**3.0000e-005**	**6.6000e-004**	**1.6000e-004**	**3.0000e-005**	**1.9000e-004**	**0.0000**	**12.2032**	**12.2032**	**1.1000e-003**	**0.0000**	**12.2308**

3.13 Alamitos Creek WBSG - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.4400e-003	0.0333	0.0185	7.0000e-005		1.1300e-003	1.1300e-003		1.0400e-003	1.0400e-003	0.0000	6.2066	6.2066	1.9800e-003	0.0000	6.2562
Total	**3.4400e-003**	**0.0333**	**0.0185**	**7.0000e-005**	**1.5900e-003**	**1.1300e-003**	**2.7200e-003**	**1.7000e-004**	**1.0400e-003**	**1.2100e-003**	**0.0000**	**6.2066**	**6.2066**	**1.9800e-003**	**0.0000**	**6.2562**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0100e-003	0.0532	8.3600e-003	6.0000e-005	1.1000e-004	3.0000e-005	1.4000e-004	3.0000e-005	3.0000e-005	6.0000e-005	0.0000	6.0453	6.0453	6.9000e-004	0.0000	6.0624
Vendor	1.0000e-005	4.0000e-004	1.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0394	0.0394	0.0000	0.0000	0.0395
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0200e-003**	**0.0536**	**8.4600e-003**	**6.0000e-005**	**1.1000e-004**	**3.0000e-005**	**1.4000e-004**	**3.0000e-005**	**3.0000e-005**	**6.0000e-005**	**0.0000**	**6.0846**	**6.0846**	**6.9000e-004**	**0.0000**	**6.1019**

3.13 Alamitos Creek WBSG - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.5000e-004	3.6800e-003	0.0312	7.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	6.2066	6.2066	1.9800e-003	0.0000	6.2562
Total	**8.5000e-004**	**3.6800e-003**	**0.0312**	**7.0000e-005**	**1.5900e-003**	**1.1000e-004**	**1.7000e-003**	**1.7000e-004**	**1.1000e-004**	**2.8000e-004**	**0.0000**	**6.2066**	**6.2066**	**1.9800e-003**	**0.0000**	**6.2562**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0100e-003	0.0532	8.3600e-003	6.0000e-005	1.1000e-004	3.0000e-005	1.4000e-004	3.0000e-005	3.0000e-005	6.0000e-005	0.0000	6.0453	6.0453	6.9000e-004	0.0000	6.0624
Vendor	1.0000e-005	4.0000e-004	1.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0394	0.0394	0.0000	0.0000	0.0395
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0200e-003**	**0.0536**	**8.4600e-003**	**6.0000e-005**	**1.1000e-004**	**3.0000e-005**	**1.4000e-004**	**3.0000e-005**	**3.0000e-005**	**6.0000e-005**	**0.0000**	**6.0846**	**6.0846**	**6.9000e-004**	**0.0000**	**6.1019**

3.14 Reveg & Landscaping - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2000e-004	4.6300e-003	6.5800e-003	1.0000e-005		2.3000e-004	2.3000e-004		2.2000e-004	2.2000e-004	0.0000	0.9761	0.9761	1.4000e-004	0.0000	0.9796
Total	**5.2000e-004**	**4.6300e-003**	**6.5800e-003**	**1.0000e-005**	**0.0000**	**2.3000e-004**	**2.3000e-004**	**0.0000**	**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.9761**	**0.9761**	**1.4000e-004**	**0.0000**	**0.9796**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	1.7000e-004	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0169	0.0169	0.0000	0.0000	0.0169
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**1.7000e-004**	**4.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0169**	**0.0169**	**0.0000**	**0.0000**	**0.0169**

3.14 Reveg & Landscaping - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2000e-004	5.3000e-004	7.5000e-003	1.0000e-005		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.9761	0.9761	1.4000e-004	0.0000	0.9796
Total	**1.2000e-004**	**5.3000e-004**	**7.5000e-003**	**1.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.9761**	**0.9761**	**1.4000e-004**	**0.0000**	**0.9796**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	1.7000e-004	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0169	0.0169	0.0000	0.0000	0.0169
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**1.7000e-004**	**4.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0169**	**0.0169**	**0.0000**	**0.0000**	**0.0169**

3.14 Reveg & Landscaping - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0149	0.1293	0.2015	3.5000e-004		6.1700e-003	6.1700e-003		6.0300e-003	6.0300e-003	0.0000	29.9345	29.9345	4.2300e-003	0.0000	30.0403
Total	**0.0149**	**0.1293**	**0.2015**	**3.5000e-004**	**0.0000**	**6.1700e-003**	**6.1700e-003**	**0.0000**	**6.0300e-003**	**6.0300e-003**	**0.0000**	**29.9345**	**29.9345**	**4.2300e-003**	**0.0000**	**30.0403**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-004	4.5500e-003	1.2200e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.4983	0.4983	5.0000e-005	0.0000	0.4995
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-004**	**4.5500e-003**	**1.2200e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.4983**	**0.4983**	**5.0000e-005**	**0.0000**	**0.4995**

3.14 Reveg & Landscaping - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.7300e-003	0.0162	0.2301	3.5000e-004		5.0000e-004	5.0000e-004		5.0000e-004	5.0000e-004	0.0000	29.9345	29.9345	4.2300e-003	0.0000	30.0403
Total	**3.7300e-003**	**0.0162**	**0.2301**	**3.5000e-004**	**0.0000**	**5.0000e-004**	**5.0000e-004**	**0.0000**	**5.0000e-004**	**5.0000e-004**	**0.0000**	**29.9345**	**29.9345**	**4.2300e-003**	**0.0000**	**30.0403**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-004	4.5500e-003	1.2200e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.4983	0.4983	5.0000e-005	0.0000	0.4995
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-004**	**4.5500e-003**	**1.2200e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.4983**	**0.4983**	**5.0000e-005**	**0.0000**	**0.4995**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	122.85	1,478.75	1088.10	970,169	970,169
Total	122.85	1,478.75	1,088.10	970,169	970,169

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Unmitigated	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	11.0580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.1600e-003**	**1.1600e-003**	**0.0000**	**0.0000**	**1.2400e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	11.0580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.1600e-003**	**1.1600e-003**	**0.0000**	**0.0000**	**1.2400e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	78.8551	3.5700e-003	7.4000e-004	79.1640
Unmitigated	78.8551	3.5700e-003	7.4000e-004	79.1640

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 77.4463	78.8551	3.5700e-003	7.4000e-004	79.1640
Total		**78.8551**	**3.5700e-003**	**7.4000e-004**	**79.1640**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 77.4463	78.8551	3.5700e-003	7.4000e-004	79.1640
Total		**78.8551**	**3.5700e-003**	**7.4000e-004**	**79.1640**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	1.1347	0.0671	0.0000	2.8112
Unmitigated	1.1347	0.0671	0.0000	2.8112

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	5.59	1.1347	0.0671	0.0000	2.8112
Total		**1.1347**	**0.0671**	**0.0000**	**2.8112**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	5.59	1.1347	0.0671	0.0000	2.8112
Total		**1.1347**	**0.0671**	**0.0000**	**2.8112**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

B.8 Health Risk Assessment

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Construction Health Risk Assessment

date	July 16, 2019
to	Matthew Fagundes, ESA
from	Sarah Patterson, ESA
subject	Almaden Lake Improvement Project – Construction Period Health Risk Assessment (HRA)

Executive Summary

The Almaden Lake Improvement Project (Project) would be located in the City of San José's (City) Almaden Lake Park (Park). The 32-acre Almaden Lake (located entirely within the Park) formed when a quarry levee breached. The loss of the integrity of the Alamitos Creek channel and commingling of creek water with lake water has created adverse conditions for anadromous fish populations. Further, mercury-laden sediment from historic upstream mining activities continues to be transported downstream in Alamitos Creek and is deposited in Almaden Lake. Seasonal lake conditions contribute to the conversion of elemental mercury to methylmercury as well as other negative water quality conditions. The Project would address these issues by reestablishing the Alamitos Creek channel, separate the creek from Almaden Lake (lake) in order to improve anadromous fish access to spawning and rearing habitat within the upper portions of the Guadalupe River Watershed, and reduce methylmercury levels in the lake.

Construction of the Project would generate diesel particulate matter (DPM) emissions from operation of off-road equipment and heavy duty trucks. Diesel particulate matter is recognized as a carcinogen by the Office of Environmental Health Hazard Assessment (OEHHA) and based on Proposition 65. Proposition 65, also known as the Safe Drinking Water and Toxic Enforcement Act of 1986, requires California to maintain and update a list of chemicals known to cause cancer. In March 2015, OEHHA revised its health risk assessment guidelines to consider short-term emissions such as construction activities, while clarifying that, "[t]here is considerable uncertainty in trying to evaluate the cancer risk from projects that will only last a small fraction of a lifetime" (OEHHA 2015). The Bay Area Air Quality Management District (BAAQMD) health risk assessment (HRA) Guidelines generally conform to the Health Risk Assessment Guidelines adopted by OEHHA in evaluating construction impacts in environmental documents prepared pursuant to the California Environmental Quality Act (CEQA) (BAAQMD, 2017). Consequently, ESA has prepared a screening-level construction period HRA for the Project based on the revised OEHHA guidelines.

Table ES-1, Maximum Increase in Health Risk from Construction Emissions for Off-Site Residential Sensitive Receptors, summarizes the incremental increase in lifetime cancer risk, non-cancer chronic hazards,

and annual average fine particulate matter ($PM_{2.5}$) concentrations for the maximally exposed residential and school receptor that would be caused by construction of the Project as proposed, and by construction of the Project with incorporation of mitigation. As shown in the table, the Project would result in a significant cancer risk for residential land uses in the vicinity of the Almaden Lake Improvement Project. However, with mitigation, the cancer risk for residential land uses would be reduced to below the BAAQMD-recommended significance threshold of 10 in one million (BAAQMD, 2017).

TABLE ES-1
MAXIMUM INCREASE IN HEALTH RISK FROM CONSTRUCTION EMISSIONS FOR OFF-SITE RESIDENTIAL SENSITIVE RECEPTORS

Scenario	Maximum Cancer Risk (# in one million)	Maximum Non-Cancer Risk (Chronic Hazard Index)	Maximum Annual Average PM2.5 Concentration (μ/m^3)
Unmitigated Project	48.4	0.15	0.22
BAAQMD Threshold	10	1	0.3
Exceeds Threshold?	Yes	No	No
Mitigated Project	5.1	0.01	0.03
BAAQMD Threshold	10	1	0.3
Exceeds Threshold?	No	No	No

Introduction

The Almaden Lake Improvement Project (Project) is located in the City of San José's (City) Almaden Lake Park (Park). As discussed in detail in Draft EIR Section 2.C, *Project Background, Need, and Objectives*, the 32-acre Almaden Lake (located entirely within Almaden Lake Park) formed when a quarry levee breached. The loss of the integrity of the Alamitos Creek channel and commingling of creek water with lake water has created adverse conditions for anadromous fish populations. Further, mercury-laden sediment from historic upstream mining activities continues to be transported downstream in Alamitos Creek and is deposited in Almaden Lake. Seasonal lake conditions contribute to the conversion of elemental mercury to methylmercury as well as other negative water quality conditions. The Project would address these issues by reestablishing the Alamitos Creek channel, separate the creek from Almaden Lake (lake) in order to improve anadromous fish access to spawning and rearing habitat within the upper portions of the Guadalupe River Watershed, and reduce methylmercury levels in the lake. Specifically, the Project would include the following improvements:

- Separation of Alamitos Creek from Almaden Lake by constructing a levee;
- Re-contouring the remaining lake bottom and capping it with clean fill;
- Expanding the Park area into a small portion of the existing lake at the beach area;
- Stabilizing the existing island and constructing a new additional island;
- Establishing appropriate native vegetation along the banks and floodplain of the restored Alamitos Creek channel, new lake edge, and the islands;
- Connecting the lake via pipeline to an imported water supply from the nearby Almaden Valley Pipeline;
- Adding a pipeline connection between the lake and the Los Alamitos Percolation Pond (Pond), which is a groundwater recharge pond operated by the District; and
- Continuing to implement source control measures, such as solar-powered circulators, to manage and reduce future methylmercury production.

Construction health risks were calculated for sensitive receptor locations within 1,000 feet of construction activities, per BAAQMD CEQA guidelines, *California Environmental Quality Act: Air Quality Guidelines* (BAAQMD, 2017).

In March 2015, the OEHHA adopted a revised guidance manual for use in the Air Toxics Hot Spots Program or for the permitting of existing, new, or modified stationary sources, the *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments*. Unlike previous iterations of this manual, the revised manual provides considerations for short-term temporary exposure for durations as short as two months, such as during construction activities, while noting that there is "considerable uncertainty in trying to evaluate the cancer risk from projects that will only last a small fraction of a lifetime." The revised OEHHA's guidance also considers more conservative assumptions and updated scientific research. Health risk impacts calculated in accordance with the OEHHA's revised manual are approximately two to ten times higher than those calculated in accordance with the previous methodology. In accordance with Regulation 2-5-402, the BAAQMD HRA Guidelines generally conform to the Health Risk Assessment Guidelines adopted by OEHHA for use in the Air Toxics Hot Spots Program (BAAQMD, 2016).

A screening-level HRA was conducted to estimate the health risk impact associated with construction of the Project. The methodology used to evaluate the health risks from on-site construction activities is summarized below, along with the results of the HRA. Due to the short-term nature of construction activities, the screening-level approach is appropriate to estimate the worst-case health risks that would be associated with Project construction.

Methods

The methods and assumptions used in this HRA are consistent with the guidance recommended by OEHHA's *Air Toxic Hot Spots Program Risk Assessment Guidelines* (2015), the BAAQMD's *Recommended Methods for Screening and Modeling Local Risks and Hazards* (2012), and the BAAQMD's *Air Toxics NSR Program Health Risk Assessment Guidelines* (2016). The OEHHA methodology used in this assessment uses a dose-response assessment to characterize risk from cancer due to inhaled TACs. Refer to Appendix A for the calculation and modeling files used in the screening HRA.

Based on the OEHHA guidance, the evaluation of potential health risks uses the following standard four-step risk assessment process:

1. hazard identification;
2. exposure assessment;
3. dose-response assessment; and
4. risk characterization.

Each step is described in detail below.

Hazard Identification

The hazard identification process is undertaken to determine what TACs would potentially be present in the assessment area, and if present, identifies what the pollutants of concern are along with their potential adverse health effects. In this HRA, the primary hazard is DPM emissions from operation of off-road construction equipment. DPM from heavy duty trucks was considered along the truck haul routes contained within the 1,000-foot Project radius. Truck haul routes outside of the Project radius were not considered, since contributions from haul trucks within the Project radius would represent the worst case DPM emissions of the sensitive receptors surrounding the Project site. In addition, total on-road truck emissions for all travel locations would be minor compared to off-road construction equipment emissions (on-road truck emissions would represent approximately 6 percent of total DPM emissions from construction).

DPM historically has been used as a surrogate measure of exposure for whole diesel exhaust emissions. Diesel exhaust is a complex mixture of thousands of gases and fine particles (commonly known as soot). Diesel exhaust particles and gases are suspended in the air due to thermal buoyancy and the small size of the particles. The composition of diesel exhaust varies depending on engine type, operating conditions, fuel composition, lubricating oil, and presence of an emission control system. One of the main characteristics of diesel exhaust is the release of particles at a relative rate approximately 20 times greater than from gasoline exhaust, on an

equivalent fuel basis. Diesel particulates are mainly aggregates of spherical carbon particles coated with inorganic and organic substances. The inorganic fraction primarily consists of small carbon (elemental carbon) particles ranging from 0.01 to 0.08 micron in diameter. The organic fraction consists of soluble organic compounds (CARB, 1998).

Exposure Assessment

The degree of the residences exposure to DPM from Project construction activities was evaluated under the exposure assessment portion of the HRA. This assessment involves the quantification of DPM emissions and dispersion modeling. The amount of DPM emissions generated by construction activities was determined using particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM_{10}) from diesel exhaust as a surrogate. OEHHA guidance indicates that the cancer potency factor to be used to evaluate cancer risks were developed based on whole (gas and particulate matter) diesel exhaust, and that the surrogate for whole diesel exhaust is DPM, with PM_{10} serving as the basis for the potential risk calculations (OEHHA, 2003). In addition to evaluating the effects of TAC concentrations, this screening HRA also evaluated annual average exhaust $PM_{2.5}$ concentrations. This is consistent with BAAQMD's CEQA Guidelines, which indicate that $PM_{2.5}$ be evaluated in community-scale impacts of air pollution based on scientific studies and recommendations by the Bay Area Health Directors to the BAAQMD's Advisory Council (BAAQMD, 2017).

The greatest potential for TAC emissions would be related to DPM emissions associated with off-road heavy equipment operations during demolition, grading and excavation, and construction activities. The potential exposure through other pathways (e.g., ingestion) requires substance and site-specific data, and the specific parameters for DPM are not known for these pathways (CARB, 1998). OEHHA developed necessary data to evaluate carcinogenicity of DPM through the inhalation pathway only. Once determined, the dose is multiplied by the compound-specific inhalation cancer potency factor to derive the cancer risk estimate. The dose takes into account the concentration at a sensitive receptor. The cancer potency factor is compound-specific.

Emissions Inventory

Emissions analyzed in the HRA were based on the air quality emissions estimates for the Project prepared for the Draft Environmental Impact Report (DEIR). The construction emissions were estimated using the BAAQMD-approved California Emissions Estimator Model (CalEEMod) model (version 2016.3.2). The air quality analysis prepared for the DEIR estimated average daily emissions for each construction phase. The construction emissions used in this HRA assumed the same construction schedule and equipment types as the analysis prepared for the DEIR.

The emissions estimates represent the average daily emissions from each phase that would be expected from construction of the Project using annual average daily heavy-duty construction equipment activity levels. For the purposes of this quantitative construction HRA, the use of average daily emissions to estimate health risks results in a reasonable approximation of impacts because construction-related health risks are calculated based on long-term emissions and not short-term maximum daily emissions.

The U.S. Environmental Protection Agency (USEPA) sets emissions standards for off-road (construction) equipment ranging from Tier 0 through Tier 4. Tier 4 emissions compliant equipment is the most stringent standard and is required for model years 2015 and newer. The Project evaluated impacts under an unmitigated

scenario where emissions were uncontrolled and a mitigated scenario where construction equipment would be compliant with Tier 4 interim emissions standards.

For the Project, total unmitigated off-road construction (average fleet mix) DPM and $PM_{2.5}$ emissions are 909 pounds and 861 pounds, respectively; total mitigated (Tier 4) DPM and $PM_{2.5}$ emissions are 68 pounds each. Total on-road construction (haul truck trips) DPM and $PM_{2.5}$ emissions are 55 pounds and 53 pounds, respectively.

Emission Rates

Because each emission source was modeled separately within AERMOD (see section below), ESA used a unitized emission rate concept for each source, where each source is modeled with a unitized emission rate of 1 gram/second (g/s). The modeled concentration at each receptor ([μ/m^3]/[g/s]) represents a "dispersion factor," which was then multiplied by the actual emission rate of each source to determine actual concentrations, and the final result from all the sources was superimposed. This approach is called the "Summation Concept," where the concentration and deposition fluxes at each receptor are the linear addition of the resulting values from each source.

Actual emission rates from construction activities were based on the anticipated hours of activity for each source and other information as described in the *Emissions Inventory* section above. A total emission rate in terms of grams per second was calculated for each emission source to multiply with the AERMOD dispersion factors to estimate actual concentrations for each source. The emission rates would vary day to day, with some days having no emissions. For simplicity, the model assumed a constant emission rate during an entire year, and is based on the total duration of construction activities (708 calendar days or approximately 2 years), 13 hours per day, and 3,600 seconds per hour, consistent with AERMOD dispersion parameters. Construction activities would likely not occur 13 hours per day but a generous daytime construction window was modeled as a conservative approach.

Dispersion Modeling

Dispersion modeling predicts the air pollutant concentrations due to emissions from a source at defined receptor point locations. The most current version (18081) of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) was used in the modeling analysis for this Project. The AERMOD model is a USEPA-approved model that was introduced to incorporate air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources and both simple and complex terrain. The AERMOD model requires numerous inputs, such as meteorological data, source parameters, topographical data, and receptor characteristics. Where Project-specific information is not available, ESA used default parameter sets that are designed to produce conservative (i.e., overestimates of) air concentrations (USEPA, 2018). **Table 1**, **Overall AERMOD Modeling Parameters**, summarizes the overall modeling parameters used in AERMOD. For values not listed, defaults were used. Refer to Appendix A for the AERMOD modeling outputs used in the screening HRA.

TABLE 1
OVERALL AERMOD MODELING PARAMETERS

Pathway	Description	Parameter
Control	Rural/Urban	Rural [a]
	Terrain	Elevated
	Model Version	AERMOD v 18081
Receptor	Receptor Height	1.5 m [b]
Meteorology [c]	Surface Station	N.Y. MINETA SN JO INTL APT (23293)
	Upper Air Station	OAKLAND/WSO AP (23230)
	MET Years	2009-2014
	Base Elevation (MSL)	15.5 m

NOTES:
[a] From BAAQMD (2012). Urban R2 defined as: Dense single/multi-family with less than 30% vegetation.
[b] From BAAQMD (2012).
[c] From CARB (2015).

ABBREVIATIONS: m = meters

SOURCES:
1. Bay Area Air Quality Management District. 2012. *Recommended Methods for Screening and Modeling Local Risks and Hazards*. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf. Accessed February 2019.

2. California Air Resources Board. 2015. Meteorological Data from Air Districts (Met Station: Norman Y. Mineta San Jose International Airport). Available online at https://www.arb.ca.gov/toxics/harp/metfiles2.htm. Accessed February 2019

Source Parameters

Source parameters are required to model the dispersion of emissions. Off-road construction equipment was modeled as an area source within AERMOD using the same release parameters used in the San Francisco Citywide HRA, which evaluates the cumulative lifetime cancer risks and annual average exhaust $PM_{2.5}$ concentrations from existing known sources of air pollution as part of the development of a Community Risk Reduction Plan (CRRP) (referred to as the CRRP-HRA). Parameters from the CRRP-HRA include a release height of 3.89 meters and an initial vertical dimension of 1.4 meters for off-road sources and an initial vertical dimension of 2.3 meters for on-road sources (BAAQMD, SF DPH & SF Planning, 2012). The release height for on-road sources was considered as the height of a truck or 10 feet (3.05 meters) as recommended by the BAAQMD (BAAQMD, 2012). Construction activities at the site were modeled as a single area source occupying 39.5-acres. The truck haul trips were modeled as line sources along the major roadways the haul trucks could potentially take within the 1,000 feet parameter modeling domain.. **Table 2**, **Source Modeling Parameters for Off-Road and On-Road Construction Equipment**, summarizes the source modeling parameters used in AERMOD.

TABLE 2
SOURCE MODELING PARAMETERS FOR OFF-ROAD AND ON-ROAD CONSTRUCTION EQUIPMENT

Source	Project Component	Source Type	Source Dimension	Number of Sources	Release Height [m]	Initial Vertical Dimension [m]
Off-Road Construction Equipment	Lake Improvement	Area Poly	39.5 acre	1	3.89	1.4
On-Road Construction Equipment (Haul Trucks)	Almaden Expressway	Line Area	0.92 miles long x 120 ft. wide	1	3.05	2.3
	Coleman Road	Line Area	0.57 miles long X 70 ft. wide	1	3.05	2.3
	Winfield Boulevard	Line Area	0.41 miles long X 70 ft. wide	1	3.05	2.3

Sensitive Receptors

Sensitive receptors were formed in 50 meter by 50 meter grids within the residential areas existing in the 1,000-foot project parameter as determined by BAAQMD modeling guidance (BAAQMD, 2012). There are no schools or daycares within 1,000 feet of this site. The Pioneer High School is located 1,600 feet northwest of the site; although this is beyond 1,000 feet, this school receptor was modeled to determine the health risk at the school closest to the Project. Receptor heights were set at 1.5 meters to represent flagpole receptor concentrations, consistent with BAAQMD modeling guidance (BAAQMD, 2012). The Project would not include any residential uses and would not include any sensitive receptors on site. Consequently, no on-site receptors were modeled.

Dose-Response Assessment

The dose-response assessment is the process of characterizing the relationship between exposure to diesel exhaust and the incidence of an adverse health effect in exposed populations.

The estimation of potential inhalation cancer risk posed by exposure to DPM requires a cancer potency factor. Cancer potency factors are expressed as the upper bound probability of developing cancer assuming continuous lifetime exposure to diesel exhaust at a dose of one milligram per kilogram of body weight, and are expressed in units of inverse dose as a potency slope (i.e., $[mg/kg/day]^{-1}$). A cancer potency factor when multiplied by the dose of a carcinogen gives the associated lifetime cancer risk. OEHHA's recommended cancer potency factor for DPM is 1.1 $(mg/kg/day)^{-1}$. The estimation of potential inhalation chronic non-cancer effects posed by exposure to DPM requires a chronic reference exposure level (REL). A chronic REL is a concentration level (that is expressed in units of $\mu g/m^3$ for inhalation exposures), at or below which no adverse health effects are anticipated following long-term exposure. OEEHA's recommended chronic REL for DPM is 5 $\mu g/m^3$ (CARB & OEHHA, 2017). The chronic hazard index target organ for DPM is the respiratory system.

Risk Characterization

Risk characterization combines the maximum annual average ground-level DPM concentration from the exposure assessment and the cancer potency factor and chronic REL from the dose-response analysis to estimate the potential inhalation cancer risk from exposure to DPM emissions.

In performing health risk calculations, carcinogenic compounds are not considered to have threshold levels (i.e., dose levels below which there are no risks). Any exposure, therefore, will have some associated risk. Incremental health risks associated with exposure to carcinogenic compounds is defined in terms of the probability of developing cancer as a result of exposure to a chemical at a given concentration. Under a deterministic approach (i.e., point estimate methodology), the cancer risk probability is determined by multiplying the chemical's annual concentration by its unit risk factor (URF). The URF for DPM recommended by the Scientific Review Panel[1] is 3.0×10^{-4} µg/m^3 (CARB, 1998). This value corresponds to a Cancer Potency Factor (CPF) of 1.1 per milligram/kilogram (body weight) per day (mg/kg(bw)-day) (CARB & OEHHA, 2017). The URF for DPM means that for receptors with an annual average concentration of 1 µg/m^3 in the ambient air, the probability of contracting cancer over a 70-year lifetime of exposure is 300 in 1 million. The URF also assumes that a person is exposed continuously for a 70-year lifetime. This approach for calculating cancer risk is intended to result in conservative (i.e., health protective) estimates of health impacts and is used for assessing risks to sensitive receptors. The estimation of cancer risk generally uses the following algorithms (OEHHA, 2015):

$$\textbf{Cancer Risk} = \textbf{Dose inhalation} \times \textbf{Inhalation CPF} \times \textbf{ASF} \times \textbf{ED/AT} \times \textbf{FAH} \qquad \textbf{(Equation 1)}$$

Where:

Cancer Risk = residential inhalation cancer risk

$$\textbf{Dose inhalation (mg/kg-day)} = \mathbf{C_{AIR}} \times \textbf{DBR} \times \textbf{A} \times \textbf{EF} \times \mathbf{10^{-6}} \qquad \textbf{(Equation 2)}$$

Inhalation CPF = inhalation cancer potency factor ([mg/kg/day]$^{-1}$)

ASF = age sensitivity factor for a specified age group (unitless)

ED = exposure duration for a specified age group (years)

AT = averaging time period over which exposure is averaged in days (years)

FAH = fraction of time at home (unitless)

[1] The Scientific Review Panel is charged with evaluating the risk assessments of substances proposed for identification as toxic air contaminants by CARB, OEHHA, and the Department of Pesticide Regulation (DPR), and the review of guidelines prepared by OEHHA.

Where:

C_{AIR} = concentration of compound in air in micrograms per cubic meter ($\mu g/m^3$)

DBR = daily breathing rate in liter per kilogram of body weight per day (L/kg-body weight/day)

A = inhalation absorption factor (1 for DPM, unitless)

EF = exposure frequency in days per year (unitless, days/365 days)

10^{-6} = micrograms to milligrams conversion, liters to cubic meters conversion

The OEHHA-recommended values for the parameters listed above were used in the HRA analysis. The daily breathing rate (DBR) used in the analysis was based on OEHHA recommendations, which vary depending on age, as shown in **Table 3, Daily Breathing Rates, Fraction of Time at Home, and Age Sensitivity Factors**. The recommended residential exposure frequency (EF) is 350 days per year, which is equivalent to 0.96 (350 days / 365 days a year). The recommended school exposure frequency (EF) is 180 days per year, which is equivalent to 0.49 (180 days / 365 days a year). The inhalation absorption factor (A) is assumed to be 1 for inhalation based risk assessment. As indicated in Equation 1 above, each age group has different exposure parameters that require cancer risk to be calculated separately for each age group. Values for fraction of time at home (FAH) also vary depending on age, as shown in Table 3. Once dose is calculated, cancer risk is calculated by accounting for cancer potency of the specific pollutant, and the age sensitivity factor (ASF), which also varies by age as shown in Table 3.

TABLE 3
DAILY BREATHING RATES, FRACTION OF TIME AT HOME, AND AGE SENSITIVITY FACTORS

Parameter	3rd Trimester	Age 0 < 2	Age 2 < 16
Daily Breathing Rate (DBR) (L/kg-body weight/day)			
Residential Child Receptor [a]	361	1,090	n/a
School Receptor [b]	n/a	n/a	745
Exposure Frequency (EF)			
Residential Child Receptor [c]	0.96	0.96	n/a
School Receptor [d]	n/a	n/a	0.49
Fraction of Time at Home (FAH)			
Residential Child Receptor [e]	0.85	0.85	n/a
School Receptor	n/a	n/a	0.33
Age Sensitivity Factor (ASF) [f]	10	10	3

NOTES:

[a] Daily breathing rate for residential receptor is based on the OEHHA 95th percentile values (Table 5.6). Since total exposure is 390 days, the 2<9 age group is not applicable.

[b] Daily breathing rate for school receptor is based on the OEHHA 95th percentile 8-hour moderate intensity breathing rates (Table 5.8). School receptor assumed to start exposure as early as age 2. Recommendation of BAAQMD (2016)

[c] The recommended residential exposure frequency (EF) is 350 days per year, which is equivalent to 0.96 (350 days / 365 days a year).

[d] The recommended school exposure frequency (EF) is 180 days per year, which is equivalent to 0.49 (180 days / 365 days a year).

[e] Fraction of time at home is set to 0.85 for residential since the nearest school has an unmitigated cancer risk of <1 per million (see Table 2 below), per OEHHA Table 8.4. FAH is not applicable to school receptors.

The estimation of non-cancer inhalation chronic risk uses the following algorithm (OEHHA, 2015):

Hazard Quotient = C_{air} / REL (Equation 3)

Where:

Hazard Quotient = chronic non-cancer hazard

C_{AIR} = concentration of compound in air in micrograms per cubic meter ($\mu g/m^3$)

REL = Chronic non-cancer Reference Exposure Level for substance ($\mu g/m^3$)

As noted above, the REL for DPM is 5 $\mu g/m^3$ (CARB & OEHHA, 2017). The chronic hazard index target organ for DPM is the respiratory system.

Health Risk Calculations

The resulting health risk calculations were performed using a the OEHHA guidance and the results of the AERMOD dispersion model. **Table 4, Maximum Increase in Health Risk from Construction Emissions for Off-Site Sensitive Receptors - Unmitigated** summarizes the carcinogenic risk for the maximum impacted sensitive receptors for the unmitigated scenario. **Table 5, Maximum Increase in Health Risk from Construction Emissions for Off-Site Sensitive Receptors - Mitigated** summarizes the carcinogenic risk for the maximum impacted sensitive receptors for the mitigated scenario.

For carcinogenic exposures, the cancer risk from DPM emissions for the unmitigated construction scenario is estimated to result in a maximum carcinogenic risk of approximately 48.4 per one million for the Project. Under the mitigated construction scenario, the Project is estimated to result in a maximum incremental increase in carcinogenic risk of 5.1 per one million. The maximum impact for the Project would occur at the residential land uses directly east of the site. As discussed previously, the lifetime exposure under OEHHA guidelines takes into account early life (infant and children) exposure. It should be noted that the calculated cancer risk assumes sensitive receptors (residential uses) would not have any emission controls such as mechanical filtration and exposure would occur with windows open. This HRA focuses on residential and school impacts and does not include impacts for on-site or off-site workers. Although off-site workers may be in close proximity to the Project site, their intermittent exposure duration would be less than that of a residence (8 hours compared to 24 hours) and adult breathing rates compared to children are also lower (e.g. 261 for age 16 < 30 versus 1,090 for age 0 < 2 years). Therefore, worker impacts would be less than that of a residence.

TABLE 4
MAXIMUM INCREASE IN HEALTH RISK FROM CONSTRUCTION EMISSIONS FOR OFF-SITE SENSITIVE RECEPTORS - UNMITIGATED

Project Component / Sensitive Receptor Type	Maximum Cancer Risk (# in one million)	Maximum Non-Cancer Risk (Chronic Hazard Index)	Maximum Annual Average PM2.5 Concentration (μ/m^3)
Residential Receptor	48.4	0.15	0.22
School Receptor	0.7	<0.01	0.01
BAAQMD Threshold	**10**	**1**	**0.3**
Exceeds Threshold at Residential Receptors?	**Yes**	**No**	**No**
Exceeds Threshold at School Receptor?	**No**	**No**	**No**

Health risk calculations are provided in Appendix A.

TABLE 5
MAXIMUM INCREASE IN HEALTH RISK FROM CONSTRUCTION EMISSIONS FOR OFF-SITE SENSITIVE RECEPTORS - MITIGATED

Project Component / Sensitive Receptor Type	Maximum Cancer Risk (# in one million)	Maximum Non-Cancer Risk (Chronic Hazard Index)	Maximum Annual Average PM2.5 Concentration (μ/m^3)
Residential Receptor	5.1	0.01	0.03
School Receptor	0.02	<0.001	<0.01
BAAQMD Threshold	**10**	**1**	**0.3**
Exceeds Threshold at Residential Receptors?	**No**	**No**	**No**
Exceeds Threshold at School Receptor?	**No**	**No**	**No**

Health risk calculations are provided in Appendix A.

The process of assessing health risks and impacts includes a degree of uncertainty. The level of uncertainty is dependent on the availability of data and the extent to which assumptions are relied upon in cases where the data are incomplete or unknown. All HRAs rely upon scientific studies in order to reduce the level of uncertainty; however, it is not possible to completely eliminate uncertainty from the analysis. Where assumptions are used to substitute for incomplete or unknown data, it is standard practice in performing HRAs to err on the side of health protection in order to avoid underestimating or underreporting the risk to the public by assessing risk on the most sensitive populations, such as children and the elderly.

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AERMOD Modeling Files

```
**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 9.6.5
** Lakes Environmental Software Inc.
** Date: 7/15/2019
** File: C:\Model\Almaden Lake\Almaden Lake_AERMOD_v2\Almaden Lake_AERMOD_v2.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE C:\Model\Almaden Lake\Almaden Lake_AERMOD_v2\Almaden Lake_AERMOD_v2.
   MODELOPT DFAULT CONC
   AVERTIME 1 PERIOD
   POLLUTID PM_10
   FLAGPOLE 1.50
   RUNORNOT RUN
   ERRORFIL "Almaden Lake_AERMOD_v2.err"
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
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** DESCRSRC Almaden Lake - main construction
** ------------------------------------------------------------------
** Line Source Represented by Area Sources
** LINE AREA Source ID = HAUL2
** DESCRSRC Haul Truck _ POO
** PREFIX
** Length of Side = 36.58
** Ratio = 10
** Vertical Dimension = 2.30
** Emission Rate = 0.0000183975
** Nodes = 6
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** 599899.259, 4121931.264, 61.29, 3.05
** 599802.919, 4122246.956, 61.45, 3.05
** 599788.880, 4122373.940, 61.27, 3.05
** 599807.840, 4122619.685, 60.64, 3.05
** 599768.028, 4123062.900, 58.02, 3.05
** ----------------------------------------------------------------------
   LOCATION A0000019     AREA     599993.504 4121607.409 64.01
   LOCATION A0000020     AREA     599916.751 4121936.602 61.64
   LOCATION A0000021     AREA     599821.096 4122248.966 61.16
   LOCATION A0000022     AREA     599807.114 4122372.533 61.27
   LOCATION A0000023     AREA     599826.054 4122621.322 60.26
   LOCATION A0000024     AREA     599806.149 4122842.929 58.90
** End of LINE AREA Source ID = HAUL2
** ----------------------------------------------------------------------
** Line Source Represented by Area Sources
** LINE AREA Source ID = HAUL1
** DESCRSRC Haule Route to SCQ
** PREFIX
** Length of Side = 21.34
** Ratio = 10
** Vertical Dimension = 2.30
** Emission Rate = 0.0000515424
** Nodes = 4
** 599810.485, 4122380.298, 61.25, 3.05
** 600140.671, 4122463.900, 60.57, 3.05
** 600236.186, 4122455.627, 61.97, 3.05
** 600689.694, 4122321.756, 66.76, 3.05
** ----------------------------------------------------------------------
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   LOCATION A0000007     AREA     599978.197 4122411.757 60.05
   LOCATION A0000008     AREA     600139.750 4122453.272 60.19
   LOCATION A0000009     AREA     600233.166 4122445.396 60.88
   LOCATION A0000010     AREA     600384.335 4122400.772 62.20
   LOCATION A0000018     AREA     600535.505 4122356.148 63.73
** End of LINE AREA Source ID = HAUL1
** ----------------------------------------------------------------------
** Line Source Represented by Area Sources
** LINE AREA Source ID = HAUL3
** DESCRSRC Haul 3
** PREFIX
** Length of Side = 21.34
** Ratio = 10
** Vertical Dimension = 2.30
** Emission Rate = 0.0000710695
** Nodes = 4
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** 600246.495, 4121847.913, 66.56, 3.05
** 600318.080, 4122071.259, 61.88, 3.05
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** 600310.921, 4122419.163, 60.93, 3.05
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   LOCATION A0000013     AREA     600256.654 4121844.657 66.02
   LOCATION A0000014     AREA     600292.446 4121956.330 63.08
   LOCATION A0000015     AREA     600328.746 4122071.478 62.04
   LOCATION A0000016     AREA     600325.166 4122245.431 61.30
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   AREAVERT CONSTR1      599915.508 4122215.897 599891.699 4122187.886
   AREAVERT CONSTR1      599883.295 4122134.666 599905.704 4122091.249
   AREAVERT CONSTR1      599909.905 4122067.440 600033.152 4122019.822
   AREAVERT CONSTR1      600063.964 4121989.011 600098.977 4121899.377
   AREAVERT CONSTR1      600153.598 4121913.382 600244.632 4122053.435
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   SRCPARAM A0000022     0.0000183975     3.048   246.476    36.576   -85.588
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   SRCPARAM A0000023     0.0000183975     3.048   222.499    36.576   -95.133
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   SRCPARAM A0000024     0.0000183975     3.048   222.499    36.576   -95.133
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   SRCPARAM A0000008     0.0000515424     3.048    95.873    21.336     4.950
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   SRCPARAM A0000018     0.0000515424     3.048   157.618    21.336    16.446
2.300
** ----------------------------------------------------------------
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   SRCPARAM A0000013     0.0000710695     3.048   117.269    21.336   -72.229
2.300
   SRCPARAM A0000014     0.0000710695     3.048   117.269    21.336   -72.229
2.300
   SRCPARAM A0000015     0.0000710695     3.048   173.989    21.336   -91.179
2.300
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2.300
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** Variable Emission Scenario: "Scenario 2"
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   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
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   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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   EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
   EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
   EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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   EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
   EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   SRCGROUP CONSTR1  CONSTR1
   SRCGROUP HAULROUT A0000019 A0000020 A0000021 A0000022 A0000023 A0000024
   SRCGROUP HAULROUT A0000006 A0000007 A0000008 A0000009 A0000010 A0000018
   SRCGROUP HAULROUT A0000012 A0000013 A0000014 A0000015 A0000016
   SRCGROUP ALL
SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED "Almaden Lake_AERMOD_v2.rou"
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE 724945\724945.SFC
   PROFFILE 724945\724945.PFL
   SURFDATA 23293 2009
   UAIRDATA 23230 2009 OAKLAND/WSO_AP
   PROFBASE 15.5 METERS
ME FINISHED
**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST
   RECTABLE 1 1ST
** Auto-Generated Plotfiles
   PLOTFILE 1 ALL 1ST "ALMADEN LAKE_AERMOD_V2.AD\01H1GALL.PLT" 31
   PLOTFILE 1 CONSTR1 1ST "ALMADEN LAKE_AERMOD_V2.AD\01H1G001.PLT" 32
```

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   PLOTFILE 1 HAULROUT 1ST "ALMADEN LAKE_AERMOD_V2.AD\01H1G002.PLT" 33
   PLOTFILE PERIOD ALL "ALMADEN LAKE_AERMOD_V2.AD\PE00GALL.PLT" 34
   PLOTFILE PERIOD CONSTR1 "ALMADEN LAKE_AERMOD_V2.AD\PE00G001.PLT" 35
   PLOTFILE PERIOD HAULROUT "ALMADEN LAKE_AERMOD_V2.AD\PE00G002.PLT" 36
   SUMMFILE "Almaden Lake_AERMOD_v2.sum"
OU FINISHED
**
************************************
** Project Parameters
************************************
** PROJCTN  CoordinateSystemUTM
** DESCPTN  UTM: Universal Transverse Mercator
** DATUM    World Geodetic System 1984
** DTMRGN   Global Definition
** UNITS    m
** ZONE     10
** ZONEINX  0
**
```

```
  *** AERMOD - VERSION  18081 ***   *** C:\Model\Almaden Lake\Almaden
Lake_AERMOD_v2\Almaden Lake_AERMOD_v2. ***        07/15/19
 *** AERMET - VERSION  14134 ***   ***
                       ***        16:21:51

                                  PAGE   1
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  RURAL

                                          ***     MODEL SETUP OPTIONS SUMMARY
 ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

 **Other Options Specified:
        CCVR_Sub - Meteorological data includes CCVR substitutions
        TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Accepts FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  PM_10

 **Model Calculates  1 Short Term Average(s) of:   1-HR
     and Calculates PERIOD Averages

 **This Run Includes:     18 Source(s);       3 Source Group(s); and     188
Receptor(s)

                with:      0 POINT(s), including
                           0 POINTCAP(s) and      0 POINTHOR(s)
                 and:      0 VOLUME source(s)
                 and:     18 AREA type source(s)
```

```
                and:      0 LINE source(s)
                and:      0 OPENPIT source(s)
                and:      0 BUOYANT LINE source(s) with      0 line(s)


 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of PERIOD Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE
Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE
Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE
Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =    15.50 ;  Decay
Coef. =    0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;
Emission Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.6 MB of RAM.

 **Input Runstream File:          aermod.inp

 **Output Print File:             aermod.out


 **Detailed Error/Message File:   Almaden Lake_AERMOD_v2.err

 **File for Summary of Results:   Almaden Lake_AERMOD_v2.sum

 *** AERMOD - VERSION  18081 ***   *** C:\Model\Almaden Lake\Almaden
Lake_AERMOD_v2\Almaden Lake_AERMOD_v2. ***        07/15/19
 *** AERMET - VERSION  14134 ***   ***
                       ***        16:21:51

                                  PAGE   2
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  RURAL
```

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1
1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1
1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1
1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1
1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1
1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1
1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1
1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
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NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 724945\724945.SFC
Met Version: 14134
Profile file: 724945\724945.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 23293 Upper air station no.: 23230
Name: UNKNOWN Name: OAKLAND/WSO_AP
Year: 2009 Year: 2009

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
09	01	01	1	01	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.25	1.10	1.00	0.00	0.	10.0	282.5	2.0
09	01	01	1	02	-13.4	0.236	-9.000	-9.000	-999.	275.	89.0	0.32	1.10	1.00	2.36	18.	10.0	282.5	2.0
09	01	01	1	03	-7.9	0.139	-9.000	-9.000	-999.	128.	30.9	0.32	1.10	1.00	1.76	4.	10.0	282.0	2.0
09	01	01	1	04	-12.4	0.217	-9.000	-9.000	-999.	242.	74.8	0.25	1.10	1.00	2.36	73.	10.0	281.4	2.0
09	01	01	1	05	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.25	1.10	1.00	0.00	0.	10.0	282.0	2.0
09	01	01	1	06	-9.7	0.170	-9.000	-9.000	-999.	168.	46.1	0.47	1.10	1.00	1.76	342.	10.0	281.4	2.0
09	01	01	1	07	-13.5	0.236	-9.000	-9.000	-999.	275.	88.6	0.32	1.10	1.00	2.36	5.	10.0	281.4	2.0
09	01	01	1	08	-19.7	0.345	-9.000	-9.000	-999.	486.	189.6	0.47	1.10	0.74	2.86	333.	10.0	280.9	2.0
09	01	01	1	09	-8.3	0.363	-9.000	-9.000	-999.	526.	525.4	0.47	1.10	0.39	2.86	327.	10.0	280.9	2.0
09	01	01	1	10	8.1	0.382	0.288	0.014	106.	566.	-625.1	0.47	1.10	0.27	2.86	351.	10.0	280.9	2.0
09	01	01	1	11	17.6	-9.000	-9.000	-9.000	189.	-999.	-99999.0	0.25	1.10	0.23	0.00	0.	10.0	280.9	2.0
09	01	01	1	12	23.0	-9.000	-9.000	-9.000	259.	-999.	-99999.0	0.25	1.10	0.21	0.00	0.	10.0	281.4	2.0
09	01	01	1	13	23.9	-9.000	-9.000	-9.000	315.	-999.	-99999.0	0.25	1.10	0.21	0.00	0.	10.0	281.4	2.0
09	01	01	1	14	48.5	-9.000	-9.000	-9.000	407.	-999.	-99999.0	0.25	1.10	0.22	0.00	0.	10.0	283.1	2.0
09	01	01	1	15	69.5	0.319	0.953	0.016	453.	433.	-42.6	0.32	1.10	0.25	2.36	32.	10.0	283.1	2.0
09	01	01	1	16	24.5	-9.000	-9.000	-9.000	460.	-999.	-99999.0	0.25	1.10	0.33	0.00	0.	10.0	283.1	2.0
09	01	01	1	17	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.25	1.10	0.57	0.00	0.	10.0	283.1	2.0
09	01	01	1	18	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.25	1.10	1.00	0.00	0.	10.0	282.5	2.0

```
 09 01 01   1 19  -24.2  0.212 -9.000 -9.000 -999.  235.     35.9  0.47   1.10
1.00    2.36  324.   10.0  281.4    2.0
 09 01 01   1 20 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.25   1.10
1.00    0.00    0.   10.0  281.4    2.0
 09 01 01   1 21 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.25   1.10
1.00    0.00    0.   10.0  280.9    2.0
 09 01 01   1 22 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.25   1.10
1.00    0.00    0.   10.0  280.9    2.0
 09 01 01   1 23 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.25   1.10
1.00    0.00    0.   10.0  280.4    2.0
 09 01 01   1 24   -9.7  0.170 -9.000 -9.000 -999.  168.     45.7  0.47   1.10
1.00    1.76  310.   10.0  280.4    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 09 01 01 01   10.0 1 -999.  -99.00   282.6   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
↑ *** AERMOD - VERSION  18081 ***   *** C:\Model\Almaden Lake\Almaden
Lake_AERMOD_v2\Almaden Lake_AERMOD_v2. ***        07/15/19
 *** AERMET - VERSION  14134 ***   ***
                       ***        16:21:51

                                   PAGE   4
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  RURAL

                                        *** THE SUMMARY OF MAXIMUM PERIOD ( 43872
HRS) RESULTS ***


                                     ** CONC OF PM_10    IN MICROGRAMS/M**3
             **


                      NETWORK
GROUP ID                      AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

CONSTR1   1ST HIGHEST VALUE IS      9.43079 AT (  600331.70,  4122140.15,    61.73,
 1062.53,    1.50)  DC
          2ND HIGHEST VALUE IS      9.37403 AT (  600331.70,  4122090.15,    61.91,
 1062.53,    1.50)  DC
          3RD HIGHEST VALUE IS      9.25666 AT (  600331.70,  4122190.15,    61.48,
 1062.53,    1.50)  DC
          4TH HIGHEST VALUE IS      8.85211 AT (  600331.70,  4122240.15,    61.44,
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 1062.53,    1.50)  DC
          5TH HIGHEST VALUE IS       8.16820 AT (  600331.70,  4122290.15,    61.44,
 1062.53,    1.50)  DC
          6TH HIGHEST VALUE IS       7.88468 AT (  600331.70,  4122040.15,    62.40,
 1062.53,    1.50)  DC
          7TH HIGHEST VALUE IS       7.01198 AT (  600331.70,  4122340.15,    61.44,
 1062.53,    1.50)  DC
          8TH HIGHEST VALUE IS       6.37480 AT (  600381.70,  4122140.15,    62.47,
 1062.53,    1.50)  DC
          9TH HIGHEST VALUE IS       6.35138 AT (  600381.70,  4122090.15,    62.64,
 1062.53,    1.50)  DC
         10TH HIGHEST VALUE IS       6.20335 AT (  600381.70,  4122190.15,    62.23,
 1062.53,    1.50)  DC

HAULROUT  1ST HIGHEST VALUE IS      51.06861 AT (  600431.70,  4122390.15,    62.81,
 1062.53,    1.50)  DC
          2ND HIGHEST VALUE IS      45.62420 AT (  600481.70,  4122390.15,    63.32,
 1062.53,    1.50)  DC
          3RD HIGHEST VALUE IS      44.10445 AT (  600331.70,  4122090.15,    61.91,
 1062.53,    1.50)  DC
          4TH HIGHEST VALUE IS      43.70862 AT (  600331.70,  4122390.15,    61.44,
 1062.53,    1.50)  DC
          5TH HIGHEST VALUE IS      43.59071 AT (  600331.70,  4122140.15,    61.73,
 1062.53,    1.50)  DC
          6TH HIGHEST VALUE IS      42.76555 AT (  600331.70,  4122190.15,    61.48,
 1062.53,    1.50)  DC
          7TH HIGHEST VALUE IS      42.05474 AT (  600331.70,  4122240.15,    61.44,
 1062.53,    1.50)  DC
          8TH HIGHEST VALUE IS      41.87204 AT (  600331.70,  4122340.15,    61.44,
 1062.53,    1.50)  DC
          9TH HIGHEST VALUE IS      41.68965 AT (  600331.70,  4122290.15,    61.44,
 1062.53,    1.50)  DC
         10TH HIGHEST VALUE IS      35.08596 AT (  600331.70,  4122040.15,    62.40,
 1062.53,    1.50)  DC

ALL       1ST HIGHEST VALUE IS      53.47848 AT (  600331.70,  4122090.15,    61.91,
 1062.53,    1.50)  DC
          2ND HIGHEST VALUE IS      53.10506 AT (  600431.70,  4122390.15,    62.81,
 1062.53,    1.50)  DC
          3RD HIGHEST VALUE IS      53.02150 AT (  600331.70,  4122140.15,    61.73,
 1062.53,    1.50)  DC
          4TH HIGHEST VALUE IS      52.02220 AT (  600331.70,  4122190.15,    61.48,
 1062.53,    1.50)  DC
          5TH HIGHEST VALUE IS      50.90685 AT (  600331.70,  4122240.15,    61.44,
 1062.53,    1.50)  DC
          6TH HIGHEST VALUE IS      49.85785 AT (  600331.70,  4122290.15,    61.44,
 1062.53,    1.50)  DC
          7TH HIGHEST VALUE IS      48.88401 AT (  600331.70,  4122340.15,    61.44,
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 1062.53,    1.50)  DC
         8TH HIGHEST VALUE IS      48.49554 AT (  600331.70,  4122390.15,    61.44,
 1062.53,    1.50)  DC
         9TH HIGHEST VALUE IS      47.21339 AT (  600481.70,  4122390.15,    63.32,
 1062.53,    1.50)  DC
        10TH HIGHEST VALUE IS      42.97064 AT (  600331.70,  4122040.15,    62.40,
 1062.53,    1.50)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
  *** AERMOD - VERSION  18081 ***   *** C:\Model\Almaden Lake\Almaden
Lake_AERMOD_v2\Almaden Lake_AERMOD_v2. ***        07/15/19
 *** AERMET - VERSION  14134 ***   ***
                       ***        16:21:51

                                  PAGE   5
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  RURAL

                                                *** THE SUMMARY OF HIGHEST  1-HR
RESULTS ***


                                    ** CONC OF PM_10    IN MICROGRAMS/M**3
             **

                                                      DATE
                                          NETWORK
GROUP ID                           AVERAGE CONC     (YYMMDDHH)             RECEPTOR
(XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - - -

CONSTR1  HIGH   1ST HIGH VALUE IS     384.76262  ON 13120520: AT (  600131.70,
4122490.15,    61.00,  1062.53,    1.50)  DC

HAULROUT HIGH   1ST HIGH VALUE IS    1806.37250  ON 09011320: AT (  600331.70,
4122440.15,    61.84,  1062.53,    1.50)  DC

ALL      HIGH   1ST HIGH VALUE IS    1905.11321  ON 09011619: AT (  600331.70,
4122440.15,    61.84,  1062.53,    1.50)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
```

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 13130 Informational Message(s)

A Total of 43872 Hours Were Processed

A Total of 11611 Calm Hours Identified

A Total of 1519 Missing Hours Identified (3.46 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

Construction Health Risk Calculations

HRA Calculations

Haul Route Information

CalEEMod Distance	18.5	miles
AERMOD Distance	1.9	miles
Emission Fraction	10.3%	

Onsite DPM Emissions per Year

Year	Start Date	End Date	Calendar Days	Work Days	Onsite Unmitigated (tpy)	Onsite Mitigated (tpy)	Haul Routes (tpy)	Onsite Unmitigated (g/s)	Onsite Mitigated (g/s)	Haul Routes (g/s)
2021	6/1/2021	12/31/2021	213	154	0.18248	0.0146	0.00083	2.30E-02	1.84E-03	1.04E-04
2022	1/1/2022	12/31/2022	364	260	0.31746	0.0260	0.02604	2.37E-02	1.94E-03	1.94E-03
2023	1/1/2023	5/10/2023	129	93	0.03414	0.0026	0.00034	7.12E-03	5.40E-04	7.09E-05

Onsite PM2.5 (exhaust) Emissions per Year

Year	Start Date	End Date	Calendar Days	Work Days	Onsite Unmitigated (tpy)	Onsite Mitigated (tpy)	Haul Routes (tpy)	Onsite Unmitigated (g/s)	Onsite Mitigated (g/s)	Haul Routes (g/s)
2021	6/1/2021	12/31/2021	213	154	0.17188	0.0144	0.00079	2.16E-02	1.81E-03	9.94E-05
2022	1/1/2022	12/31/2022	364	260	0.29829	0.0260	0.02488	2.22E-02	1.94E-03	1.85E-03
2023	1/1/2023	5/10/2023	129	93	0.03358	0.0026	0.00032	7.00E-03	5.40E-04	6.67E-05

AERMOD Out (emission rate = 1 g/s)

UTM Easting (m)	UTM Northing (m)	Output - [ug/m³]/[g/s] Main Construction	Output - [ug/m³]/[g/s] Haul Routes	Unmitigated DPM ug/m³ 2021	Unmitigated DPM ug/m³ 2022	Unmitigated DPM ug/m³ 2023	Unmitigated PM2.5 ug/m³ 2021	Unmitigated PM2.5 ug/m³ 2022	Unmitigated PM2.5 ug/m³ 2023	Mitigated DPM ug/m³ 2021	Mitigated DPM ug/m³ 2022	Mitigated DPM ug/m³ 2023	Mitigated PM2.5 ug/m³ 2021	Mitigated PM2.5 ug/m³ 2022	Mitigated PM2.5 ug/m³ 2023
599781.7	4121640.15	0.04457	0.30537	1.03E-03	1.12E-03	3.19E-04	9.67E-04	1.05E-03	3.14E-04	8.52E-05	1.47E-04	2.63E-05	8.39E-05	1.44E-04	2.62E-05
599831.7	4121640.15	0.05133	0.44125	1.18E-03	1.30E-03	3.68E-04	1.12E-03	1.23E-03	3.62E-04	9.91E-05	1.88E-04	3.09E-05	9.75E-05	1.83E-04	3.07E-05
600031.7	4121640.15	0.12257	6.49958	2.88E-03	4.20E-03	9.19E-04	2.72E-03	3.96E-03	9.02E-04	2.95E-04	1.53E-03	1.13E-04	2.88E-04	1.47E-03	1.11E-04
600081.7	4121640.15	0.17417	3.93251	4.04E-03	4.91E-03	1.27E-03	3.81E-03	4.62E-03	1.25E-03	3.62E-04	1.12E-03	1.23E-04	3.56E-04	1.09E-03	1.21E-04
600131.7	4121640.15	0.24761	2.9023	5.72E-03	6.44E-03	1.78E-03	5.39E-03	6.06E-03	1.75E-03	4.86E-04	1.06E-03	1.55E-04	4.78E-04	1.03E-03	1.54E-04
599731.7	4121690.15	0.04609	0.31101	1.06E-03	1.15E-03	3.30E-04	1.00E-03	1.08E-03	3.25E-04	8.80E-05	1.51E-04	2.71E-05	8.67E-05	1.48E-04	2.70E-05
599781.7	4121690.15	0.05124	0.42875	1.18E-03	1.30E-03	3.68E-04	1.11E-03	1.22E-03	3.62E-04	9.88E-05	1.85E-04	3.08E-05	9.72E-05	1.81E-04	3.06E-05
599831.7	4121690.15	0.05925	0.66783	1.37E-03	1.54E-03	4.26E-04	1.29E-03	1.44E-03	4.19E-04	1.16E-04	2.48E-04	3.68E-05	1.14E-04	2.42E-04	3.66E-05
599881.7	4121690.15	0.07224	1.3154	1.67E-03	1.97E-03	5.24E-04	1.58E-03	1.86E-03	5.15E-04	1.47E-04	4.02E-04	4.86E-05	1.44E-04	3.90E-04	4.80E-05
600031.7	4121690.15	0.15358	6.02721	3.59E-03	4.84E-03	1.14E-03	3.38E-03	4.56E-03	1.12E-03	3.47E-04	1.50E-03	1.27E-04	3.40E-04	1.44E-03	1.24E-04
600081.7	4121690.15	0.26018	3.92901	6.02E-03	6.94E-03	1.88E-03	5.67E-03	6.53E-03	1.85E-03	5.20E-04	1.29E-03	1.69E-04	5.12E-04	1.25E-03	1.67E-04
600131.7	4121690.15	0.36934	2.9873	8.52E-03	9.34E-03	2.65E-03	8.02E-03	8.78E-03	2.61E-03	7.11E-04	1.31E-03	2.21E-04	7.00E-04	1.28E-03	2.20E-04
599731.7	4121740.15	0.05411	0.40571	1.25E-03	1.36E-03	3.88E-04	1.17E-03	1.28E-03	3.82E-04	1.04E-04	1.86E-04	3.22E-05	1.02E-04	1.82E-04	3.20E-05
599781.7	4121740.15	0.06008	0.57381	1.39E-03	1.54E-03	4.32E-04	1.31E-03	1.45E-03	4.24E-04	1.17E-04	2.31E-04	3.66E-05	1.15E-04	2.26E-04	3.64E-05
599831.7	4121740.15	0.06961	0.92091	1.61E-03	1.83E-03	5.02E-04	1.52E-03	1.72E-03	4.94E-04	1.38E-04	3.19E-04	4.43E-05	1.36E-04	3.10E-04	4.39E-05
599881.7	4121740.15	0.08585	1.88208	1.99E-03	2.41E-03	6.25E-04	1.88E-03	2.27E-03	6.14E-04	1.78E-04	5.42E-04	6.00E-05	1.75E-04	5.24E-04	5.92E-05
599981.7	4121740.15	0.15974	11.11814	3.79E-03	6.00E-03	1.22E-03	3.57E-03	5.67E-03	1.19E-03	4.13E-04	2.52E-03	1.67E-04	4.03E-04	2.43E-03	1.62E-04
600031.7	4121740.15	0.23306	5.6321	5.41E-03	6.64E-03	1.70E-03	5.10E-03	6.25E-03	1.67E-03	4.89E-04	1.57E-03	1.67E-04	4.80E-04	1.52E-03	1.64E-04
600081.7	4121740.15	0.34437	3.87243	7.95E-03	8.92E-03	2.48E-03	7.49E-03	8.40E-03	2.44E-03	6.74E-04	1.44E-03	2.14E-04	6.64E-04	1.40E-03	2.12E-04
599681.7	4121790.15	0.05958	0.38244	1.37E-03	1.49E-03	4.27E-04	1.29E-03	1.40E-03	4.20E-04	1.14E-04	1.92E-04	3.49E-05	1.12E-04	1.88E-04	3.48E-05
599731.7	4121790.15	0.06487	0.50743	1.50E-03	1.64E-03	4.65E-04	1.41E-03	1.54E-03	4.58E-04	1.25E-04	2.27E-04	3.87E-05	1.23E-04	2.22E-04	3.85E-05
599781.7	4121790.15	0.07219	0.72826	1.67E-03	1.85E-03	5.19E-04	1.57E-03	1.74E-03	5.10E-04	1.40E-04	2.85E-04	4.43E-05	1.38E-04	2.78E-04	4.40E-05
599831.7	4121790.15	0.08388	1.18461	1.94E-03	2.22E-03	6.05E-04	1.83E-03	2.09E-03	5.95E-04	1.67E-04	3.99E-04	5.39E-05	1.64E-04	3.88E-04	5.34E-05
599881.7	4121790.15	0.1045	2.54038	2.43E-03	2.98E-03	7.62E-04	2.29E-03	2.81E-03	7.49E-04	2.19E-04	7.09E-04	7.49E-05	2.15E-04	6.86E-04	7.38E-05
599681.7	4121840.15	0.06847	0.45582	1.58E-03	1.71E-03	4.91E-04	1.49E-03	1.61E-03	4.82E-04	1.31E-04	2.24E-04	4.03E-05	1.29E-04	2.19E-04	4.01E-05
599731.7	4121840.15	0.07959	0.6111	1.83E-03	2.01E-03	5.71E-04	1.73E-03	1.89E-03	5.61E-04	1.53E-04	2.76E-04	4.74E-05	1.50E-04	2.70E-04	4.71E-05
599781.7	4121840.15	0.08926	0.88579	2.06E-03	2.29E-03	6.42E-04	1.94E-03	2.15E-03	6.31E-04	1.74E-04	3.50E-04	5.46E-05	1.71E-04	3.41E-04	5.42E-05
599831.7	4121840.15	0.10454	1.46468	2.42E-03	2.77E-03	7.55E-04	2.28E-03	2.60E-03	7.42E-04	2.08E-04	4.95E-04	6.71E-05	2.04E-04	4.81E-04	6.65E-05
599881.7	4121840.15	0.13236	3.48156	3.08E-03	3.83E-03	9.67E-04	2.90E-03	3.61E-03	9.50E-04	2.81E-04	9.50E-04	9.68E-05	2.75E-04	9.19E-04	9.53E-05
599631.7	4121890.15	0.07826	0.4193	1.80E-03	1.94E-03	5.60E-04	1.70E-03	1.82E-03	5.51E-04	1.48E-04	2.35E-04	4.53E-05	1.46E-04	2.31E-04	4.51E-05
599681.7	4121890.15	0.08557	0.53313	1.97E-03	2.13E-03	6.13E-04	1.86E-03	2.00E-03	6.03E-04	1.63E-04	2.72E-04	5.01E-05	1.61E-04	2.67E-04	4.98E-05
599731.7	4121890.15	0.10068	0.71839	2.32E-03	2.53E-03	7.22E-04	2.19E-03	2.38E-03	7.10E-04	1.93E-04	3.39E-04	5.96E-05	1.90E-04	3.32E-04	5.93E-05
599781.7	4121890.15	0.11461	1.05053	2.64E-03	2.92E-03	8.23E-04	2.49E-03	2.75E-03	8.09E-04	2.22E-04	4.32E-04	6.95E-05	2.18E-04	4.22E-04	6.91E-05
599831.7	4121890.15	0.13643	1.79255	3.15E-03	3.59E-03	9.84E-04	2.97E-03	3.38E-03	9.67E-04	2.70E-04	6.22E-04	8.67E-05	2.66E-04	6.05E-04	8.59E-05
599881.7	4121890.15	0.17829	5.06991	4.15E-03	5.23E-03	1.31E-03	3.91E-03	4.93E-03	1.28E-03	3.82E-04	1.36E-03	1.33E-04	3.75E-04	1.31E-03	1.31E-04
599631.7	4121940.15	0.0971	0.48088	2.24E-03	2.39E-03	6.94E-04	2.11E-03	2.25E-03	6.83E-04	1.84E-04	2.84E-04	5.59E-05	1.81E-04	2.80E-04	5.57E-05
599681.7	4121940.15	0.1085	0.61463	2.50E-03	2.69E-03	7.77E-04	2.35E-03	2.53E-03	7.64E-04	2.06E-04	3.33E-04	6.30E-05	2.03E-04	3.27E-04	6.28E-05
599731.7	4121940.15	0.13042	0.83091	3.00E-03	3.25E-03	9.34E-04	2.83E-03	3.06E-03	9.19E-04	2.49E-04	4.19E-04	7.64E-05	2.45E-04	4.11E-04	7.61E-05
599781.7	4121940.15	0.15184	1.23084	3.50E-03	3.84E-03	1.09E-03	3.30E-03	3.61E-03	1.07E-03	2.92E-04	5.40E-04	9.09E-05	2.88E-04	5.28E-04	9.04E-05
599831.7	4121940.15	0.18504	2.22622	4.27E-03	4.82E-03	1.33E-03	4.03E-03	4.54E-03	1.31E-03	3.64E-04	8.03E-04	1.16E-04	3.58E-04	7.82E-04	1.15E-04
600331.7	4121940.15	4.27957	19.3764	9.85E-02	1.05E-01	3.06E-02	9.28E-02	9.89E-02	3.01E-02	8.07E-03	1.22E-02	2.45E-03	7.95E-03	1.20E-02	2.44E-03
599631.7	4121990.15	0.12166	0.54677	2.80E-03	2.99E-03	8.70E-04	2.64E-03	2.81E-03	8.55E-04	2.29E-04	3.45E-04	6.97E-05	2.26E-04	3.40E-04	6.94E-05
599681.7	4121990.15	0.13927	0.70044	3.21E-03	3.44E-03	9.96E-04	3.02E-03	3.23E-03	9.80E-04	2.63E-04	4.10E-04	8.03E-05	2.60E-04	4.03E-04	8.00E-05
599731.7	4121990.15	0.17261	0.95234	3.97E-03	4.28E-03	1.24E-03	3.74E-03	4.02E-03	1.21E-03	3.27E-04	5.25E-04	1.00E-04	3.23E-04	5.15E-04	9.97E-05
599781.7	4121990.15	0.20725	1.44955	4.78E-03	5.19E-03	1.49E-03	4.50E-03	4.88E-03	1.46E-03	3.96E-04	6.91E-04	1.22E-04	3.90E-04	6.77E-04	1.22E-04
599831.7	4121990.15	0.26184	2.96312	6.05E-03	6.79E-03	1.88E-03	5.70E-03	6.39E-03	1.85E-03	5.13E-04	1.10E-03	1.63E-04	5.05E-04	1.07E-03	1.62E-04
600331.7	4121990.15	5.69921	24.91087	1.31E-01	1.40E-01	4.07E-02	1.24E-01	1.31E-01	4.01E-02	1.07E-02	1.60E-02	3.26E-03	1.06E-02	1.58E-02	3.25E-03
600381.7	4121990.15	4.77695	13.982	1.10E-01	1.16E-01	3.41E-02	1.03E-01	1.09E-01	3.35E-02	8.93E-03	1.21E-02	2.68E-03	8.80E-03	1.19E-02	2.67E-03
600431.7	4121990.15	4.02942	9.9514	9.27E-02	9.74E-02	2.87E-02	8.73E-02	9.15E-02	2.83E-02	7.51E-03	9.81E-03	2.25E-03	7.41E-03	9.70E-03	2.24E-03
600481.7	4121990.15	3.32921	7.77973	7.66E-02	8.03E-02	2.37E-02	7.21E-02	7.55E-02	2.34E-02	6.20E-03	8.01E-03	1.85E-03	6.11E-03	7.93E-03	1.85E-03
600531.7	4121990.15	2.64188	6.01882	6.07E-02	6.37E-02	1.88E-02	5.72E-02	5.99E-02	1.85E-02	4.92E-03	6.33E-03	1.47E-03	4.85E-03	6.26E-03	1.47E-03
600581.7	4121990.15	2.08991	4.73522	4.81E-02	5.04E-02	1.49E-02	4.53E-02	4.74E-02	1.47E-02	3.89E-03	5.00E-03	1.16E-03	3.84E-03	4.95E-03	1.16E-03
599631.7	4122040.15	0.15454	0.61564	3.56E-03	3.78E-03	1.10E-03	3.35E-03	3.55E-03	1.09E-03	2.91E-04	4.23E-04	8.79E-05	2.86E-04	4.16E-04	8.76E-05
599681.7	4122040.15	0.18092	0.78819	4.16E-03	4.44E-03	1.29E-03	3.92E-03	4.17E-03	1.27E-03	3.41E-04	5.08E-04	1.03E-04	3.36E-04	5.00E-04	1.03E-04
599731.7	4122040.15	0.23369	1.08858	5.38E-03	5.75E-03	1.67E-03	5.07E-03	5.40E-03	1.64E-03	4.41E-04	6.71E-04	1.34E-04	4.35E-04	6.60E-04	1.34E-04
599781.7	4122040.15	0.29433	1.74039	6.78E-03	7.31E-03	2.11E-03	6.39E-03	6.88E-03	2.07E-03	5.60E-04	9.18E-04	1.72E-04	5.51E-04	9.01E-04	1.71E-04
599831.7	4122040.15	0.39251	4.352	9.06E-03	1.02E-02	2.82E-03	8.54E-03	9.56E-03	2.78E-03	7.68E-04	1.63E-03	2.44E-04	7.56E-04	1.59E-03	2.42E-04
600331.7	4122040.15	7.88468	35.08596	1.81E-01	1.94E-01	5.64E-02	1.71E-01	1.82E-01	5.54E-02	1.49E-02	2.23E-02	4.51E-03	1.46E-02	2.19E-02	4.50E-03
600381.7	4122040.15	5.84737	16.35508	1.34E-01	1.42E-01	4.17E-02	1.27E-01	1.33E-01	4.10E-02	1.09E-02	1.46E-02	3.28E-03	1.08E-02	1.44E-02	3.27E-03
600431.7	4122040.15	4.59905	10.87481	1.06E-01	1.11E-01	3.28E-02	9.96E-02	1.04E-01	3.23E-02	8.57E-03	1.11E-02	2.56E-03	8.45E-03	1.10E-02	2.56E-03
600481.7	4122040.15	3.74375	8.30366	8.61E-02	9.03E-02	2.67E-02	8.11E-02	8.48E-02	2.63E-02	6.97E-03	8.92E-03	2.08E-03	6.87E-03	8.83E-03	2.08E-03
600531.7	4122040.15	3.1232	6.81511	7.18E-02	7.53E-02	2.23E-02	6.76E-02	7.08E-02	2.19E-02	5.81E-03	7.42E-03	1.74E-03	5.73E-03	7.34E-03	1.73E-03
600581.7	4122040.15	2.45829	5.70437	5.65E-02	5.93E-02	1.75E-02	5.32E-02	5.58E-02	1.72E-02	4.58E-03	5.91E-03	1.37E-03	4.51E-03	5.85E-03	1.37E-03
599631.7	4122090.15	0.19455	0.68657	4.48E-03	4.74E-03	1.39E-03	4.22E-03	4.46E-03	1.37E-03	3.65E-04	5.14E-04	1.10E-04	3.60E-04	5.07E-04	1.10E-04
599681.7	4122090.15	0.23565	0.88347	5.42E-03	5.75E-03	1.68E-03	5.11E-03	5.41E-03	1.66E-03	4.43E-04	6.33E-04	1.34E-04	4.36E-04	6.24E-04	1.33E-04
599731.7	4122090.15	0.29731	1.23758	6.84E-03	7.28E-03	2.12E-03	6.44E-03	6.85E-03	2.09E-03	5.60E-04	8.24E-04	1.69E-04	5.52E-04	8.11E-04	1.69E-04
599781.7	4122090.15	0.42494	2.12269	9.78E-03	1.05E-02	3.04E-03	9.22E-03	9.85E-03	2.99E-03	8.04E-04	1.25E-03	2.45E-04	7.92E-04	1.23E-03	2.44E-04
600331.7	4122090.15	9.37403	44.10445	2.16E-01	2.31E-01	6.70E-02	2.03E-01	2.17E-01	6.59E-02	1.77E-02	2.70E-02	5.38E-03	1.74E-02	2.65E-02	5.36E-03
600381.7	4122090.15	6.35138	17.38455	1.46E-01	1.54E-01	4.53E-02	1.38E-01	1.45E-01	4.46E-02	1.19E-02	1.58E-02	3.56E-03	1.17E-02	1.56E-02	3.55E-03
600431.7	4122090.15	4.80238	11.24781	1.10E-01	1.16E-01	3.43E-02	1.04E-01	1.09E-01	3.37E-02	8.95E-03	1.16E-02	2.67E-03	8.82E-03	1.14E-02	2.67E-03
600481.7	4122090.15	3.84341	8.60967	8.84E-02	9.27E-02	2.74E-02	8.32E-02	8.71E-02	2.70E-02	7.16E-03	9.18E-03	2.14E-03	7.05E-03	9.08E-03	2.13E-03
600531.7	4122090.15	3.00862	7.06556	6.92E-02	7.26E-02	2.15E-02	6.52E-02	6.83E-02	2.11E-02	5.60E-03	7.25E-03	1.68E-03	5.53E-03	7.17E-03	1.67E-03
600581.7	4122090.15	2.34422	5.75637	5.39E-02	5.66E-02	1.67E-02	5.08E-02	5.32E-02	1.64E-02	4.37E-03	5.70E-03	1.31E-03	4.31E-03	5.63E-03	1.30E-03
599581.7	4122140.15	0.21162	0.61869	4.87E-03	5.13E-03	1.51E-03	4.58E-03	4.82E-03	1.49E-03	3.96E-04	5.34E-04	1.19E-04	3.90E-04	5.27E-04	1.18E-04
599631.7	4122140.15	0.24333	0.76141	5.60E-03	5.91E-03	1.74E-03	5.27E-03	5.56E-03	1.71E-03	4.55E-04	6.24E-04	1.37E-04	4.49E-04	6.16E-04	1.37E-04
599681.7	4122140.15	0.30403	0.98755	6.99E-03	7.39E-03	2.17E-03	6.59E-03	6.95E-03	2.13E-03	5.69E-04	7.87E-04	1.71E-04	5.61E-04	7.77E-04	1.71E-04
599731.7	4122140.15	0.3971	1.41116	9.14E-03	9.68E-03	2.84E-03	8.61E-03	9.10E-03	2.79E-03	7.45E-04	1.05E-03	2.25E-04	7.34E-04	1.04E-03	2.24E-04
599781.7	4122140.15	0.59906	2.67884	1.38E-02	1.47E-02	4.28E-03	1.30E-02	1.38E-02	4.21E-03	1.13E-03	1.70E-03	3.43E-04	1.11E-03	1.67E-03	3.42E-04
600331.7	4122140.15	9.43079	43.59071	2.17E-01	2.32E-01	6.74E-02	2.04E-01	2.18E-01	6.63E-02	1.78E-02	2.70E-02	5.41E-03	1.75E-02	2.66E-02	5.39E-03
600381.7	4122140.15	6.3748	17.61966	1.47E-01	1.54E-01	4.55E-02	1.38E-01	1.45E-01	4.47E-02	1.19E-02	1.59E-02	3.57E-03	1.17E-02	1.57E-02	3.56E-03
600431.7	4122140.15	4.76036	11.50484	1.09E-01	1.15E-01	3.40E-02	1.03E-01	1.08E-01	3.34E-02	8.87E-03	1.15E-02	2.65E-03	8.75E-03	1.14E-02	2.65E-03
600481.7	4122140.15	3.36699	8.37134	7.74E-02	8.14E-02	2.40E-02	7.29E-02	7.65E-02	2.36E-02	6.28E-03	8.20E-03	1.88E-03	6.19E-03	8.11E-03	1.87E-03
600531.7	4122140.15	2.46244	6.41162	5.66E-02	5.96E-02	1.76E-02	5.33E-02	5.60E-02	1.73E-02	4.59E-03	6.06E-03	1.38E-03	4.53E-03	5.99E-03	1.37E-03
599581.7	4122190.15	0.25308	0.68369	5.82E-03	6.13E-03	1.81E-03	5.48E-03	5.76E-03	1.78E-03	4.72E-04	6.28E-04	1.42E-04	4.66E-04	6.20E-04	1.41E-04

599631.7	4122190.15	0.29799	0.84372	6.85E-03	7.22E-03	2.13E-03	6.46E-03	6.79E-03	2.09E-03	5.57E-04	7.47E-04	1.67E-04	5.49E-04	7.38E-04	1.67E-04
599681.7	4122190.15	0.37882	1.10617	8.71E-03	9.19E-03	2.70E-03	8.21E-03	8.64E-03	2.66E-03	7.08E-04	9.56E-04	2.13E-04	6.98E-04	9.44E-04	2.12E-04
599731.7	4122190.15	0.52883	1.64271	1.22E-02	1.28E-02	3.78E-03	1.15E-02	1.21E-02	3.71E-03	9.89E-04	1.35E-03	2.97E-04	9.75E-04	1.34E-03	2.97E-04
599781.7	4122190.15	0.76272	3.64441	1.76E-02	1.88E-02	5.45E-03	1.65E-02	1.77E-02	5.36E-03	1.44E-03	2.21E-03	4.38E-04	1.42E-03	2.17E-03	4.37E-04
600331.7	4122190.15	9.25666	42.76555	2.13E-01	2.28E-01	6.62E-02	2.01E-01	2.14E-01	6.51E-02	1.75E-02	2.65E-02	5.31E-03	1.72E-02	2.61E-02	5.29E-03
600381.7	4122190.15	6.20335	17.96201	1.43E-01	1.50E-01	4.43E-02	1.34E-01	1.41E-01	4.35E-02	1.16E-02	1.56E-02	3.48E-03	1.14E-02	1.54E-02	3.47E-03
600431.7	4122190.15	4.57879	11.85407	1.05E-01	1.11E-01	3.27E-02	9.92E-02	1.04E-01	3.21E-02	8.54E-03	1.13E-02	2.56E-03	8.42E-03	1.11E-02	2.55E-03
600481.7	4122190.15	3.15107	8.64995	7.25E-02	7.63E-02	2.25E-02	6.83E-02	7.17E-02	2.21E-02	5.88E-03	7.84E-03	1.76E-03	5.80E-03	7.75E-03	1.76E-03
600531.7	4122190.15	1.7155	5.28453	3.95E-02	4.17E-02	1.22E-02	3.72E-02	3.92E-02	1.20E-02	3.21E-03	4.38E-03	9.65E-04	3.16E-03	4.33E-03	9.62E-04
599581.7	4122240.15	0.29294	0.7529	6.74E-03	7.08E-03	2.09E-03	6.35E-03	6.66E-03	2.06E-03	5.46E-04	7.19E-04	1.64E-04	5.39E-04	7.10E-04	1.63E-04
599631.7	4122240.15	0.3619	0.93901	8.32E-03	8.75E-03	2.58E-03	7.84E-03	8.23E-03	2.54E-03	6.75E-04	8.90E-04	2.02E-04	6.66E-04	8.79E-04	2.02E-04
599681.7	4122240.15	0.46078	1.25039	1.06E-02	1.12E-02	3.29E-03	9.98E-03	1.05E-02	3.23E-03	8.60E-04	1.14E-03	2.58E-04	8.48E-04	1.13E-03	2.57E-04
599731.7	4122240.15	0.6117	1.94372	1.41E-02	1.49E-02	4.37E-03	1.33E-02	1.40E-02	4.29E-03	1.14E-03	1.57E-03	3.44E-04	1.13E-03	1.55E-03	3.44E-04
599781.7	4122240.15	0.85365	5.5736	1.97E-02	2.13E-02	6.11E-03	1.85E-02	2.00E-02	6.01E-03	1.63E-03	2.77E-03	5.01E-04	1.60E-03	2.71E-03	4.99E-04
600331.7	4122240.15	8.85211	42.05474	2.04E-01	2.18E-01	6.33E-02	1.92E-01	2.05E-01	6.22E-02	1.67E-02	2.56E-02	5.08E-03	1.65E-02	2.51E-02	5.07E-03
600381.7	4122240.15	5.82076	18.26822	1.34E-01	1.41E-01	4.16E-02	1.26E-01	1.33E-01	4.09E-02	1.09E-02	1.49E-02	3.28E-03	1.07E-02	1.47E-02	3.27E-03
600431.7	4122240.15	4.23963	12.33379	9.75E-02	1.03E-01	3.03E-02	9.18E-02	9.66E-02	2.98E-02	7.92E-03	1.07E-02	2.38E-03	7.81E-03	1.06E-02	2.37E-03
600481.7	4122240.15	3.00474	9.75575	6.91E-02	7.31E-02	2.15E-02	6.51E-02	6.87E-02	2.11E-02	5.63E-03	7.78E-03	1.69E-03	5.55E-03	7.67E-03	1.69E-03
600531.7	4122240.15	1.69182	6.58594	3.89E-02	4.14E-02	1.21E-02	3.67E-02	3.89E-02	1.19E-02	3.18E-03	4.60E-03	9.61E-04	3.13E-03	4.53E-03	9.58E-04
599581.7	4122290.15	0.32773	0.82627	7.54E-03	7.92E-03	2.34E-03	7.10E-03	7.45E-03	2.30E-03	6.11E-04	8.01E-04	1.83E-04	6.02E-04	7.92E-04	1.83E-04
599631.7	4122290.15	0.40296	1.04146	9.27E-03	9.74E-03	2.87E-03	8.73E-03	9.16E-03	2.83E-03	7.52E-04	9.90E-04	2.25E-04	7.41E-04	9.78E-04	2.25E-04
599681.7	4122290.15	0.50773	1.40716	1.17E-02	1.23E-02	3.62E-03	1.10E-02	1.16E-02	3.56E-03	9.48E-04	1.27E-03	2.84E-04	9.35E-04	1.25E-03	2.84E-04
599731.7	4122290.15	0.65914	2.25759	1.52E-02	1.61E-02	4.71E-03	1.43E-02	1.51E-02	4.63E-03	1.24E-03	1.73E-03	3.72E-04	1.22E-03	1.71E-03	3.71E-04
600331.7	4122290.15	8.1682	41.68965	1.88E-01	2.02E-01	5.84E-02	1.77E-01	1.90E-01	5.75E-02	1.55E-02	2.42E-02	4.71E-03	1.52E-02	2.37E-02	4.69E-03
600381.7	4122290.15	5.22451	18.81822	1.20E-01	1.27E-01	3.73E-02	1.13E-01	1.20E-01	3.67E-02	9.80E-03	1.39E-02	2.96E-03	9.66E-03	1.37E-02	2.95E-03
600431.7	4122290.15	3.7093	13.28765	8.53E-02	9.04E-02	2.65E-02	8.04E-02	8.50E-02	2.61E-02	6.96E-03	9.85E-03	2.10E-03	6.86E-03	9.71E-03	2.09E-03
600481.7	4122290.15	2.78738	11.32654	6.41E-02	6.82E-02	1.99E-02	6.04E-02	6.41E-02	1.96E-02	5.24E-03	7.67E-03	1.59E-03	5.17E-03	7.55E-03	1.58E-03
600531.7	4122290.15	2.00737	10.83395	4.62E-02	4.97E-02	1.44E-02	4.35E-02	4.67E-02	1.41E-02	3.81E-03	6.06E-03	1.16E-03	3.75E-03	5.95E-03	1.16E-03
600581.7	4122290.15	0.92948	7.49327	2.14E-02	2.35E-02	6.67E-03	2.02E-02	2.21E-02	6.56E-03	1.79E-03	3.30E-03	5.56E-04	1.76E-03	3.23E-03	5.53E-04
599581.7	4122340.15	0.35301	0.91478	8.12E-03	8.54E-03	2.52E-03	7.65E-03	8.02E-03	2.48E-03	6.59E-04	8.68E-04	1.97E-04	6.49E-04	8.58E-04	1.97E-04
599631.7	4122340.15	0.43095	1.1592	9.91E-03	1.04E-02	3.08E-03	9.34E-03	9.80E-03	3.02E-03	8.04E-04	1.07E-03	2.41E-04	7.93E-04	1.06E-03	2.41E-04
599681.7	4122340.15	0.53611	1.58226	1.23E-02	1.30E-02	3.83E-03	1.16E-02	1.22E-02	3.76E-03	1.00E-03	1.36E-03	3.01E-04	9.88E-04	1.34E-03	3.00E-04
599731.7	4122340.15	0.67951	2.57049	1.56E-02	1.66E-02	4.85E-03	1.47E-02	1.56E-02	4.77E-03	1.28E-03	1.83E-03	3.86E-04	1.26E-03	1.80E-03	3.84E-04
600331.7	4122340.15	7.01198	41.87204	1.62E-01	1.74E-01	5.02E-02	1.52E-01	1.64E-01	4.94E-02	1.33E-02	2.20E-02	4.09E-03	1.31E-02	2.15E-02	4.07E-03
600381.7	4122340.15	4.25815	20.33818	9.80E-02	1.05E-01	3.04E-02	9.23E-02	9.86E-02	2.99E-02	8.04E-03	1.23E-02	2.45E-03	7.93E-03	1.21E-02	2.44E-03
600431.7	4122340.15	2.93592	16.4129	6.76E-02	7.28E-02	2.10E-02	6.37E-02	6.84E-02	2.07E-02	5.57E-03	8.97E-03	1.70E-03	5.49E-03	8.81E-03	1.70E-03
600481.7	4122340.15	2.18207	17.053	5.03E-02	5.50E-02	1.57E-02	4.74E-02	5.18E-02	1.54E-02	4.19E-03	7.63E-03	1.30E-03	4.13E-03	7.47E-03	1.29E-03
600531.7	4122340.15	1.70967	21.63889	3.95E-02	4.48E-02	1.23E-02	3.72E-02	4.21E-02	1.21E-02	3.37E-03	7.63E-03	1.08E-03	3.32E-03	7.43E-03	1.07E-03
600581.7	4122340.15	1.04187	27.32084	2.42E-02	3.01E-02	7.61E-03	2.28E-02	2.84E-02	7.48E-03	2.21E-03	7.47E-03	7.61E-04	2.17E-03	7.22E-03	7.49E-04
599581.7	4122390.15	0.36825	1.0065	8.47E-03	8.92E-03	2.63E-03	7.98E-03	8.38E-03	2.58E-03	6.88E-04	9.15E-04	2.06E-04	6.78E-04	9.05E-04	2.06E-04
599631.7	4122390.15	0.44596	1.29755	1.03E-02	1.08E-02	3.18E-03	9.66E-03	1.02E-02	3.13E-03	8.33E-04	1.12E-03	2.50E-04	8.22E-04	1.11E-03	2.50E-04
599681.7	4122390.15	0.5476	1.81602	1.26E-02	1.33E-02	3.91E-03	1.19E-02	1.25E-02	3.85E-03	1.03E-03	1.42E-03	3.09E-04	1.01E-03	1.41E-03	3.08E-04
599731.7	4122390.15	0.68173	3.08335	1.57E-02	1.67E-02	4.87E-03	1.48E-02	1.57E-02	4.79E-03	1.29E-03	1.94E-03	3.90E-04	1.27E-03	1.91E-03	3.89E-04
600331.7	4122390.15	4.78692	43.70862	1.10E-01	1.22E-01	3.44E-02	1.04E-01	1.15E-01	3.38E-02	9.27E-03	1.80E-02	2.90E-03	9.12E-03	1.76E-02	2.88E-03
600381.7	4122390.15	2.83946	30.738	6.55E-02	7.33E-02	2.04E-02	6.17E-02	6.90E-02	2.01E-02	5.55E-03	1.16E-02	1.76E-03	5.46E-03	1.13E-02	1.74E-03
600431.7	4122390.15	2.03644	51.06861	4.73E-02	5.84E-02	1.49E-02	4.46E-02	5.50E-02	1.46E-02	4.29E-03	1.41E-02	1.47E-03	4.21E-03	1.37E-02	1.45E-03
600481.7	4122390.15	1.58918	45.6242	3.70E-02	4.67E-02	1.16E-02	3.48E-02	4.40E-02	1.14E-02	3.41E-03	1.22E-02	1.19E-03	3.35E-03	1.18E-02	1.17E-03
600531.7	4122390.15	1.30114	20.38925	3.01E-02	3.49E-02	9.41E-03	2.84E-02	3.28E-02	9.25E-03	2.61E-03	6.59E-03	8.51E-04	2.57E-03	6.40E-03	8.42E-04
600581.7	4122390.15	0.6495	7.46703	1.50E-02	1.69E-02	4.68E-03	1.41E-02	1.59E-02	4.60E-03	1.27E-03	2.75E-03	4.05E-04	1.25E-03	2.68E-03	4.02E-04
599581.7	4122440.15	0.37638	1.07828	8.66E-03	9.12E-03	2.69E-03	8.15E-03	8.58E-03	2.64E-03	7.03E-04	9.45E-04	2.11E-04	6.93E-04	9.34E-04	2.11E-04
599631.7	4122440.15	0.45111	1.40969	1.04E-02	1.10E-02	3.22E-03	9.77E-03	1.03E-02	3.17E-03	8.44E-04	1.16E-03	2.54E-04	8.32E-04	1.14E-03	2.53E-04
599681.7	4122440.15	0.54502	2.0015	1.25E-02	1.33E-02	3.89E-03	1.18E-02	1.25E-02	3.83E-03	1.02E-03	1.46E-03	3.09E-04	1.01E-03	1.44E-03	3.08E-04
599731.7	4122440.15	0.66613	3.3704	1.53E-02	1.64E-02	4.76E-03	1.44E-02	1.55E-02	4.69E-03	1.26E-03	1.96E-03	3.84E-04	1.24E-03	1.93E-03	3.83E-04
599781.7	4122440.15	0.82958	12.25197	1.92E-02	2.21E-02	5.99E-03	1.81E-02	2.08E-02	5.89E-03	1.66E-03	4.05E-03	5.37E-04	1.63E-03	3.94E-03	5.32E-04
600331.7	4122440.15	2.19625	33.10676	5.08E-02	5.86E-02	1.59E-02	4.79E-02	5.51E-02	1.56E-02	4.39E-03	1.09E-02	1.43E-03	4.32E-03	1.06E-02	1.41E-03
600381.7	4122440.15	1.68976	17.53798	3.90E-02	4.35E-02	1.22E-02	3.67E-02	4.09E-02	1.19E-02	3.29E-03	6.77E-03	1.04E-03	3.24E-03	6.61E-03	1.03E-03
600431.7	4122440.15	1.37553	12.34576	3.17E-02	3.50E-02	9.88E-03	2.99E-02	3.29E-02	9.71E-03	2.66E-03	5.13E-03	8.32E-04	2.62E-03	5.01E-03	8.27E-04
600481.7	4122440.15	1.03771	9.42721	2.39E-02	2.64E-02	7.45E-03	2.25E-02	2.49E-02	7.33E-03	2.01E-03	3.89E-03	6.29E-04	1.98E-03	3.80E-03	6.25E-04
600531.7	4122440.15	0.79276	6.49856	1.83E-02	2.01E-02	5.69E-03	1.72E-02	1.89E-02	5.59E-03	1.53E-03	2.83E-03	4.75E-04	1.50E-03	2.77E-03	4.72E-04
600581.7	4122440.15	0.37692	2.94405	8.69E-03	9.51E-03	2.70E-03	8.18E-03	8.94E-03	2.66E-03	7.24E-04	1.32E-03	2.25E-04	7.13E-04	1.29E-03	2.24E-04
600031.7	4122490.15	2.1792	8.49474	5.01E-02	5.33E-02	1.56E-02	4.72E-02	5.01E-02	1.53E-02	4.10E-03	5.92E-03	1.24E-03	4.04E-03	5.84E-03	1.23E-03
600081.7	4122490.15	2.41508	9.66103	5.56E-02	5.91E-02	1.73E-02	5.23E-02	5.55E-02	1.70E-02	4.54E-03	6.61E-03	1.37E-03	4.48E-03	6.51E-03	1.37E-03
600131.7	4122490.15	2.47651	11.23744	5.70E-02	6.09E-02	1.77E-02	5.37E-02	5.72E-02	1.74E-02	4.67E-03	7.05E-03	1.42E-03	4.60E-03	6.93E-03	1.41E-03
600181.7	4122490.15	2.26258	10.96879	5.21E-02	5.57E-02	1.62E-02	4.91E-02	5.24E-02	1.59E-02	4.28E-03	6.58E-03	1.30E-03	4.21E-03	6.47E-03	1.30E-03
600231.7	4122490.15	1.76468	9.82142	4.06E-02	4.37E-02	1.26E-02	3.83E-02	4.11E-02	1.24E-02	3.35E-03	5.38E-03	1.02E-03	3.30E-03	5.29E-03	1.02E-03
600281.7	4122490.15	1.72697	9.63455	3.98E-02	4.28E-02	1.24E-02	3.75E-02	4.02E-02	1.22E-02	3.28E-03	5.27E-03	1.00E-03	3.23E-03	5.18E-03	9.98E-04
600331.7	4122490.15	1.41659	8.98489	3.26E-02	3.53E-02	1.01E-02	3.07E-02	3.32E-02	9.98E-03	2.70E-03	4.54E-03	8.30E-04	2.66E-03	4.45E-03	8.26E-04
600381.7	4122490.15	1.0169	7.09952	2.34E-02	2.55E-02	7.29E-03	2.21E-02	2.40E-02	7.17E-03	1.94E-03	3.39E-03	6.01E-04	1.92E-03	3.32E-03	5.98E-04
600431.7	4122490.15	0.75276	5.07269	1.73E-02	1.88E-02	5.39E-03	1.63E-02	1.77E-02	5.30E-03	1.44E-03	2.47E-03	4.43E-04	1.42E-03	2.42E-03	4.41E-04
600481.7	4122490.15	0.5396	3.71611	1.24E-02	1.35E-02	3.87E-03	1.17E-02	1.27E-02	3.80E-03	1.03E-03	1.79E-03	3.18E-04	1.02E-03	1.75E-03	3.17E-04
600531.7	4122490.15	0.32548	2.29329	7.50E-03	8.16E-03	2.33E-03	7.07E-03	7.67E-03	2.29E-03	6.23E-04	1.09E-03	1.92E-04	6.13E-04	1.07E-03	1.91E-04
600581.7	4122490.15	0.22006	1.48184	5.07E-03	5.50E-03	1.58E-03	4.78E-03	5.18E-03	1.55E-03	4.20E-04	7.22E-04	1.30E-04	4.14E-04	7.08E-04	1.29E-04
600031.7	4122540.15	1.53738	6.13396	3.54E-02	3.76E-02	1.10E-02	3.33E-02	3.54E-02	1.08E-02	2.89E-03	4.21E-03	8.75E-04	2.85E-03	4.14E-03	8.72E-04
600081.7	4122540.15	1.64115	6.24853	3.78E-02	4.01E-02	1.17E-02	3.56E-02	3.77E-02	1.15E-02	3.08E-03	4.43E-03	9.31E-04	3.04E-03	4.37E-03	9.29E-04
600131.7	4122540.15	1.66002	6.35007	3.82E-02	4.06E-02	1.19E-02	3.60E-02	3.81E-02	1.17E-02	3.12E-03	4.49E-03	9.42E-04	3.07E-03	4.42E-03	9.40E-04
600181.7	4122540.15	1.54605	6.10792	3.56E-02	3.78E-02	1.10E-02	3.35E-02	3.55E-02	1.09E-02	2.91E-03	4.22E-03	8.79E-04	2.86E-03	4.16E-03	8.76E-04
600231.7	4122540.15	0.74505	3.95675	1.72E-02	1.84E-02	5.33E-03	1.62E-02	1.73E-02	5.24E-03	1.41E-03	2.23E-03	4.31E-04	1.39E-03	2.20E-03	4.29E-04
600281.7	4122540.15	0.5974	3.56099	1.38E-02	1.48E-02	4.28E-03	1.30E-02	1.40E-02	4.21E-03	1.14E-03	1.87E-03	3.48E-04	1.12E-03	1.83E-03	3.47E-04
600331.7	4122540.15	0.61959	3.87138	1.43E-02	1.54E-02	4.44E-03	1.34E-02	1.45E-02	4.36E-03	1.18E-03	1.97E-03	3.63E-04	1.16E-03	1.94E-03	3.61E-04
600381.7	4122540.15	0.35537	2.44066	8.19E-03	8.90E-03	2.55E-03	7.71E-03	8.37E-03	2.50E-03	6.79E-04	1.18E-03	2.10E-04	6.69E-04	1.15E-03	2.09E-04
600431.7	4122540.15	0.274	1.87607	6.31E-03	6.86E-03	1.96E-03	5.95E-03	6.45E-03	1.93E-03	5.24E-04	9.06E-04	1.62E-04	5.16E-04	8.88E-04	1.61E-04
600481.7	4122540.15	0.22107	1.48333	5.09E-03	5.53E-03	1.58E-03	4.80E-03	5.20E-03	1.56E-03	4.22E-04	7.25E-04	1.30E-04	4.16E-04	7.10E-04	1.29E-04
600531.7	4122540.15	0.18835	1.21963	4.34E-03	4.70E-03	1.35E-03	4.09E-03	4.42E-03	1.33E-03	3.59E-04	6.09E-04	1.11E-04	3.54E-04	5.97E-04	1.10E-04
600581.7	4122540.15	0.17429	1.07764	4.01E-03	4.34E-03	1.25E-03	3.78E-03	4.08E-03	1.23E-03	3.32E-04	5.53E-04	1.02E-04	3.27E-04	5.43E-04	1.01E-04
600331.7	4122590.15	0.29297	1.96746	6.75E-03	7.33E-03	2.10E-03	6.36E-03	6.89E-03	2.06E-03	5.59E-04	9.61E-04	1.72E-04	5.51E-04	9.42E-04	1.72E-04
600381.7	4122590.15	0.20226	1.39854	4.66E-03	5.07E-03	1.45E-03	4.39E-03	4.76E-03	1.43E-03	3.87E-04	6.71E-04	1.19E-04	3.81E-04	6.58E-04	1.19E-04
600431.7	4122590.15	0.1821	1.22844	4.20E-03	4.55E-03	1.30E-03	3.95E-03	4.28E-03	1.28E-03	3.48E-04	5.98E-04	1.07E-04	3.43E-04	5.86E-04	1.07E-04
600481.7	4122590.15	0.17777	1.15049	4.10E-03	4.44E-03	1.27E-03	3.86E-03	4.17E-03	1.25E-03	3.39E-04	5.74E-04	1.04E-04	3.34E-04	5.63E-04	1.04E-04
600531.7	4122590.15	0.16954	1.04767	3.91E-03	4.22E-03	1.21E-03	3.68E-03	3.97E-03	1.19E-03	3.23E-04	5.38E-04	9.91E-05	3.18E-04	5.28E-04	9.87E-05
600331.7	4122640.15	0.58091	3.01755	1.34E-02	1.44E-02	4.16E-03	1.26E-02	1.35E-02	4.09E-03	1.10E-03	1.73E-03	3.36E-04	1.08E-03	1.70E-03	3.34E-04
600381.7	4122640.15	0.21505	1.42173	4.95E-03	5.37E-03	1.54E-03	4.67E-03	5.05E-03	1.51E-03	4.10E-04	7.01E-04	1.26E-04	4.04E-04	6.87E-04	1.26E-04
600431.7	4122640.15	0.21678	1.38398	4.99E-03	5.41E-03	1.55E-03	4.70E-03	5.08E-03	1.53E-03	4.13E-04	6.97E-04	1.27E-04	4.07E-04	6.83E-04	1.26E-04
600481.7	4122640.15	0.44364	2.29593	1.02E-02	1.10E-02	3.17E-03	9.62E-03	1.03E-02	3.12E-03	8.40E-04	1.32E-03	2.56E-04	8.28E-04	1.30E-03	2.55E-04
600531.7	4122640.15	0.4414	2.26243	1.02E-02	1.09E-02	3.16E-03	9.57E-03	1.02E-02	3.10E-03	8.35E-04	1.31E-03	2.55E-04	8.23E-04	1.29E-03	2.54E-04
600331.7	4122690.15	0.65198	2.90406	1.50E-02	1.60E-02	4.66E-03	1.41E-02	1.51E-02	4.58E-03	1.23E-03	1.84E-03	3.73E-04	1.21E-03	1.82E-03	3.72E-04
600381.7	4122690.15	0.56589	2.65413	1.30E-02	1.39E-02	4.05E-03	1.23E-02	1.31E-02	3.98E-03	1.07E-03	1.63E-03	3.25E-04	1.05E-03	1.60E-03	3.24E-04
600431.7	4122690.15	0.51632	2.42358	1.19E-02	1.27E-02	3.69E-03	1.12E-02	1.19E-02	3.63E-03	9.75E-04	1.49E-03	2.96E-04	9.61E-04	1.46E-03	2.95E-04
600481.7	4122690.15	0.48674	2.22414	1.12E-02	1.20E-02	3.48E-03	1.06E-02	1.12E-02	3.42E-03	9.18E-04	1.39E-03	2.79E-04	9.05E-04	1.37E-03	2.78E-04
600581.7	4122290.15	0.92948	7.49327	2.14E-02	2.35E-02	6.67E-03	2.02E-02	2.21E-02	6.56E-03	1.79E-03	3.30E-03	5.56E-04	1.76E-03	3.23E-03	5.53E-04
600581.7	4122140.15	1.90742	5.35925	4.39E-02	4.62E-02	1.36E-02	4.13E-02	4.34E-02	1.34E-02	3.56E-03	4.77E-03	1.07E-03	3.51E-03	4.71E-03	1.07E-03
600581.7	4122190.15	1.21282	4.25262	2.79E-02	2.96E-02	8.66E-03	2.63E-02	2.78E-02	8.52E-03	2.27E-03	3.20E-03	6.86E-04	2.24E-03	3.16E-03	6.84E-04
600581.7	4122240.15	0.89323	4.31439	2.06E-02	2.20E-02	6.39E-03	1.94E-02	2.07E-02	6.28E-03	1.69E-03	2.59E-03	5.14E-04	1.66E-03	2.55E-03	5.12E-04
599524.18	4122705.96	0.27144	0.93969	6.24E-03	6.61E-03	1.94E-03	5.88E-03	6.22E-03	1.91E-03	5.09E-04	7.14E-04	1.53E-04	5.02E-04	7.04E-04	1.53E-04
599209.41	4122867.81	0.13537	0.4322	3.11E-03	3.29E-03	9.66E-04	2.93E-03	3.09E-03	9.50E-04	2.53E-04	3.49E-04	7.62E-05	2.50E-04	3.44E-04	7.60E-05

MEISR				Unmitigated		Mitigated	
		UTM X	UTM Y	DPM (ug/m^3)	$PM_{2.5}$ (ug/m^3)	DPM (ug/m^3)	$PM_{2.5}$ (ug/m^3)
Resident	2021	600331.7	4122140.15	2.17E-01	2.04E-01	1.78E-02	1.75E-02
	2022	600331.7	4122140.15	2.32E-01	2.18E-01	2.70E-02	2.66E-02
	2023	600331.7	4122140.15	6.74E-02	6.63E-02	5.41E-03	5.39E-03
School	2021	599524.18	4122705.96	6.24E-03	5.88E-03	5.09E-04	5.02E-04
	2022	599524.18	4122705.96	6.61E-03	6.22E-03	7.14E-04	7.04E-04
	2023	599524.18	4122705.96	1.94E-03	1.91E-03	1.53E-04	1.53E-04

Cancer Risk = Dose inhalation × Inhalation CPF × ASF × ED/AT × FAH **(Equation 8.2.4 A)**

Where:

Cancer Risk = residential inhalation cancer risk

Dose inhalation (mg/kg-day) = C_{AIR} × DBR × A × EF × 10^{-6} **(Equation 5.4.1.1)**

Inhalation CPF = inhalation cancer potency factor ($[mg/kg/day]^{-1}$)
ASF = age sensitivity factor for a specified age group (unitless)
ED = exposure duration for a specified age group (years)
AT = averaging time period over which exposure is averaged in days (years)
FAH = fraction of time at home (unitless)

Where:

C_{AIR} = concentration of compound in air in micrograms per cubic meter ($\mu g/m^3$)
DBR = daily breathing rate in liter per kilogram of body weight per day (L/kg-body weight/day)
A = inhalation absorption factor (1 for DPM, unitless)
EF = exposure frequency in days per year (unitless, days/365 days)
10^{-6} = micrograms to milligrams conversion, liters to cubic meters conversion

Hazard Quotient = C_{air} / REL **(Section 8.3.1)**

Where:

Hazard Quotient = chronic non-cancer hazard
C_{AIR} = concentration of compound in air in micrograms per cubic meter ($\mu g/m^3$)
REL = Chronic non-cancer Reference Exposure Level for substance ($\mu g/m^3$)

Dose Inhalation Inputs

Receptor Type	Exposure Scenario	Receptor Group Age	Construction Year	Unmitigated C_{AIR} ($\mu g/m^3$)	Mitigated C_{AIR} ($\mu g/m^3$)	DBR (L/kg-day)	A (unitless)	EF (days/year)
Off-Site Child Resident	Construction	3rd Trimester	2021	2.17E-01	1.78E-02	361	1	0.96
		Age 0<2	2021	2.17E-01	1.78E-02	1090	1	0.96
			2022	2.32E-01	2.70E-02	1090	1	0.96
			2023	6.74E-02	5.41E-03	1090	1	0.96
School (highschool)	Construction	Age 2<16	2021	6.24E-03	5.09E-04	745	1	0.49
			2022	6.61E-03	7.14E-04	745	1	0.49
			2023	1.94E-03	1.53E-04	745	1	0.49

Dose Inhalation Outputs

Receptor Type	Exposure Scenario	Receptor Group Age	Construction Year	Unmitigated Dose inhalation (mg/kg-day)	Mitigated Dose inhalation (mg/kg-day)
Off-Site Child Resident	Construction	3rd Trimester	2021	7.51E-05	6.16E-06
		Age 0<2	2021	2.27E-04	1.86E-05
			2022	2.43E-04	2.82E-05
			2023	7.05E-05	5.65E-06
School (highschool)	Construction	Age 2<16	2021	2.29E-06	1.87E-07
			2022	2.43E-06	2.62E-07
			2023	7.12E-07	5.63E-08

Risk Inputs

Receptor Type	Exposure Scenario	Receptor Group Age	Construction Year	CPF ($mg/kg\text{-}day^{-1}$)	ASF (unitless)	ED (years)	AT (years)	FAH (unitless)	MAF (unitless)
Off-Site Child Resident	Construction	3rd Trimester	2021	1.1	10	0.25	70.00	0.85	1
		Age 0<2	2021	1.1	10	0.33	70.00	0.85	1
			2022	1.1	10	1	70.00	0.85	1
			2023	1.1	10	0.35	70.00	0.85	1
School (highschool)	Construction	Age 2<16	2021	1.1	3	0.58	70.00	0.33	2.6
			2022	1.1	3	1.00	70.00	0.33	2.6
			2023	1.1	3	0.35	70.00	0.33	2.6

Risk Outputs

Receptor Type	Exposure Scenario	Receptor Group Age	Construction Year	Unmitigated Cancer Risk	Mitigated Cancer Risk	Unmitigated Total Risk (per million)	Mitigated Total Risk (per million)
Off-Site Child Resident	Construction	3rd Trimester	2021	2.51E-06	2.06E-07	48.37	5.08
		Age 0<2	2021	1.01E-05	8.30E-07		
			2022	3.24E-05	3.77E-06		
			2023	3.33E-06	2.67E-07		
School (highschool)	Construction	Age 2<16	2021	5.38E-08	4.39E-09	0.16	0.02
			2022	9.77E-08	1.06E-08		
			2023	1.01E-08	8.01E-10		

Receptor Type	Risk Type	Unmitigated	Mitigated	
Off-Site Child Resident	Chronic HI	0.15	0.01	unitless
	Annual PM2.5	0.22	0.03	ug/m^3
School (highschool)	Chronic HI	0.003	0.000	unitless
	Annual PM2.5	0.01	0.00	ug/m^3

SOURCE: Office of Environmental Health Hazard Assessment, 2015. *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments* . February.
Daily breathing rate for school receptor is based on the OEHHA 95th percentile 8-hour moderate intensity breathing rates (Table 5.8).
Fraction of time at home is set to 0.85 for residential since the nearest school has an unmitigated cancer risk of <1 per million, per OEHHA Table 8.4.
Inhalation cancer potency factor from Table 7.1

Appendix C
Biological Resources



C.1 Table C-1: Special-Status Plants and Animals Documented in the Project Region

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TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
FEDERAL OR STATE LISTED SPECIES			
Plants			
Castilleja affinis var. *neglecta* Tiburon paintbrush	FE/ST/1B.2	Valley and foothill grassland on rocky serpentine sites. 75-400 meters. April-June	Low. Suitable habitat not present in Study Area.
Ceanothus ferrisiae Coyote ceanothus	FE/-/1B.1	Serpentinite soils in chaparral, coastal scrub, and valley and foothill grassland. 120-460 meters. January to May.	Low. Suitable habitat not present in Study Area.
Chorizanthe pungens var. hartwegiana Ben Lomond spineflower	FE/-/1B.1	Lower montane coniferous forest, usually associated with maritime ponderosa pine sandhills. 90-610 meters. April – June	Low. No ponderosa pine or sandhill habitats present within the Study Area.
Chorizanthe pungens var. *pungens* Monterey spineflower	FT/-/1B.2	Occurs in sandy maritime chaparral, cistmontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland.	Absent. Local occurrence is historical.
Chorizanthe pungens var. hartwegii Scotts Valley spineflower	FE/-/1B.1	Meadows and seeps in valley and foothill grassland known only in Scotts Valley. 230-245 meters. April - July	Absent. Only occurs in Scotts Valley.
Chorizanthe robusta var. robusta Robust spineflower	FE/–/1B.1	Coastal scrub and coastal dunes.	Low. Suitable habitat not present in Study Area. Only occurrence in San Jose is historical.
Dudleya setchellii Santa Clara Valley dudleya	FE/-/1B.1	Rocky serpentinite areas in woodland and grassland. 60-455 meters.	Low. Lack of serpentine soils likely precludes presence of this species in Study Area.
Erysimum teretifolium Santa Cruz wallflower	FE/SE/1B.1	Chaparral, lower montane coniferous forest and inland marine sands. 120-610 meters	Absent. The Study Area lacks suitable coniferous forest and inland marine sand habitat.
Holocarpha macradenia Santa Cruz tarplant	FT/SE/1B.1	Light, sandy soil or sandy clay; often with non-natives in coastal prairie, scrub, or valley and foothill grassland.	Low. Suitable habitat not present in Study Area.
Lasthienia conjugens Contra Costa goldfields	FE/-/1B.1	Valley and foothill grassland, vernal pools, cismontane woodland; vernal pools and swales and low depressions in open grassy areas. 0-470 meters.	Low. Only local occurrence of species is assumed extirpated.
Plagiobothrys diffuses San Francisco popcorn flower	-/SE/1B.1	Historically on grassy slopes with marine influence. 60-485 meters	Low. Suitable habitat not present in Study Area.

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Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
FEDERAL OR STATE LISTED SPECIES			
Invertebrates			
Euphydryas editha bayensis Bay checkerspot butterfly	FT/-	Associated with specific host plants that typically grow on serpentine soils.	Low. Suitable habitat not present in Study Area.
Cicindela ohlone Ohlone tiger beetle	FE/-	Remnant native grasslands with California oatgrass & purple needlegrass (coastal prairie) in Santa Cruz County. Substrate is poorly-drained clay or sandy clay soil over bedrock of Santa Cruz mudstone.	Absent. Outside of species' known range and coastal prairie habitat not present in Study Area.
Fish			
Oncorhynchus mykiss coho salmon – central California coast	FT/-	Requires cold, freshwater streams with suitable gravel for spawning. Rears in rivers and tributaries to the San Francisco Bay.	Moderate. Known to occur in multiple South Bay streams including the Guadalupe River and Alamitos Creek. Likely present in all accessible reaches of these streams (Leidy et al. 2005a).
Oncorhynchus tshawytscha Central Valley fall-run Chinook salmon	-/SSC	Requires cold, freshwater streams with suitable gravel for spawning. More common in Central Valley streams, occasionally rears in tributaries to San Francisco Bay.	Moderate. Known to occur in small numbers in multiple South Bay streams including the Guadalupe River and Alamitos Creek (Leidy 2007). Genetic analysis has determined that Chinook in South Bay streams are derived hatchery stock (Moyle, 2002).
Entosphenus tridentatus Pacific lamprey	-/SSC	Requires cool, freshwater streams with suitable gravel for spawning. Rears in rivers and tributaries to San Francisco Bay.	Moderate. Known to occur in multiple South Bay streams including the Guadalupe River and Alamitos Creek (Leidy 2007). This species' status is poorly documented, and its relative abundance in streams is unknown.
Lavinia exilicauda Sacramento hitch	-/SSC	Inhabit warm, lowland waters, and clear streams. Prefer shallow stream habitat with smaller gravel and mud substrates.	Moderate. Known to occur throughout the Guadalupe River watershed and within Alamitos Creek (Leidy 2007; Smith, 2013).
Cottus gulosus Riffle sculpin	-/SSC	Require cool, headwater streams where riffle and rocky substrates predominate.	Moderate. Know to occur in the Guadalupe River watershed. Primarily confined to the swift, cool upper reaches of streams (Leidy 2007; Smith, 2013).
Amphibians			
Ambystoma californiense California tiger salamander	FT/ST	Small ponds, lakes, or vernal pools in grasslands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy.	Low. Local occurrences are historical. Suitable habitat not present in Study Area.
Rana draytonii California red-legged frog	FT/SSC	Permanent and semipermanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation; may aestivate in rodent burrows or cracks during dry periods.	Moderate. Nearest occurrence is in Guadalupe Creek, less than 2.5 miles from Study Area; however, limited suitable habitat is present within Study Area.

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
FEDERAL OR STATE LISTED SPECIES			
Birds			
Aquila chrysaetos golden eagle	BCC/FP&WL	Foothills and mountains throughout California. Uncommon non-breeding visitor to lowlands such as the Central Valley. Nest on cliffs and escarpments or in tall trees overlooking open country. Forages in annual grasslands, chaparral, and oak woodlands with plentiful medium and large-sized mammals.	Low (foraging only). May occur over the Study Area on a transient basis. Nearest occurrence is ~5 miles southeast near Calero Reservoir; however, suitable nesting habitat not present in Study Area.
Buteo swainsoni Swainson's hawk	-/ST	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, and agricultural lands with groves of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields to support rodent populations.	Low (foraging only). May occur in the Study Area riparian areas on a transient basis; however, suitable nesting habitat not present in Study Area.
Falco peregrinus anatum American peregrine falcon	DL&BCC/ DL&FP	Nests near wetlands, lakes, rivers, or other water on cliffs, banks, human structures. Feeds on birds taken in flight.	Low. Research group provided a nest box less than 2 miles north of Almaden Lake in high-rise building; however, suitable nesting habitat not present in Study Area.
OTHER SPECIAL STATUS SPECIES			
Plants			
Arctostaphylos andersonii Anderson's manzanita	-/-/1B.2	Broadleaved upland forest, chaparral, edges and openings of north coast coniferous forests. 60-730 meters.	Low. Suitable habitat not present.
Arctostaphylos silvicola Bonny dune manzanita	-/-/1B.2	Closed cone coniferous forests, chaparral and lower montane coniferous forests on inland marine-derived sandy soils. 120-600 meters.	Low. Suitable habitat not present.
Amsinckia lunaris bent-flowered fiddleneck	-/-/1B.2	Occurs in coastal bluff scrub, cismontane woodland, and valley and foothill grassland. 50-500 meters.	Low. Local occurrence in oak woodlands and grasslands; however, suitable nesting habitat not present in Study Area.
Balsamorhiza macrolepis var. *macrolepis* big scale balsamroot	-/-/1B.2	Chaparral, cismontane woodland, and valley and foothill grassland, sometimes on serpentine soils. 90-1400 meters. Blooms March – June.	Low. Suitable habitat not present.
California macrophylla round-leaved filaree	–/–/1B.1	Cismontane woodland, valley and foothill grassland.	Low. Suitable habitat not present.

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Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS SPECIES			
Plants (*cont.*)			
Calyptridium parryi Santa Cruz Mountains pussypaws	-/-/1B.2	Sandy or gravelly openings in chaparral and cistmontane woodland.	Low. Suitable habitat not present.
Campanula exigua chaparral harebell	-/-/1B.2	Found in rocky, usually serpentine, chaparral sites.	Low. Suitable habitat not present.
Carex comosa bristly sedge	-/-/2B.1	Lake margins, wet places; site below sea level is on a Delta island. 5-1620 meters.	Low. Suitable habitat present along creek fringes in the Study Area; however, site remains highly disturbed.
Castilleja rubicundula var. rubicundula pink creamsacs	-/-/1B.2	Openings in chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland. Serpentine soils. 20-915 meters. Blooms April – June.	Low. Suitable habitat not present in Study Area.
Centromadia parryi ssp. *congdonii* Congdon's tarplant	-/-/1B.1	Alkaline soils in annual grassland, on lower slopes, flats, and swales, sometimes on saline soils; below 230 meters above MSL. Blooms May - October	Absent. Only occurrence to Study Area is historical; extirpated.
Cirsium fontinale var. fontinale Mt. Hamilton fountain thistle	-/-/1B.2	Serpentine seeps; openings in cismontane woodland, chaparral, valley and foothill grassland.	Low. Suitable habitat not present in Study Area.
Clarkia concinna ssp. *automixa* Santa Clara red ribbons	-/-/4.3	Cismontane woodland and chaparral, on slopes and near drainages. 90-970 meters.	Low. Suitable habitat not present in Study Area.
Collinsia multicolor San Francisco collinsia	-/-/1B.2	Closed cone coniferous forests, coastal scrub (sometimes on serpentine soils). 30-250 meters. Blooms June-October	Low. No suitable habitat present in the Study Area. Nearest occurrence in Almaden Quicksilver Park approximately 3.5 miles south of the lake.
Eryngium aristulatum var. *hooveri* Hoover's button-celery	-/-/1B.1	Vernal pools. 3-45 meters above MSL. Blooms June - August	Low. Suitable habitat not present in Study Area.
Fissidens pauperculus minute pocket moss	-/-/1B.2	Moss growing on damp soil along coast. In dry streambeds and on stream banks. 10-1024 meters	Absent. Suitable habitat not present in Study Area.
Fritillaria liliacea fragrant fillary	-/-1B.2	Often on serpentine; although can be found in various soils, including clay in grasslands. 3-400 meters	Low. Nearest occurrence in New Almaden Quicksilver County Park, less than five miles from the Study Area.
Hoita stobilina Loma Prieta hoita	-/-/1B.1	Chaparral, cismontane woodland, riparian woodland, usually on serpentine soil and mesic sites. 30-860 meters	Low. Suitable habitat not present in Study Area.

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Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS SPECIES			
Plants (*cont.*)			
Leptosyne hamiltonii Mt. Hamilton coreopsis	-/-/1B.2	On steep shale talus with open southwestern exposure in cismontane woodland. 530-130 meters	Low. Suitable habitat not present in Study Area.
Lessingia micradenia var. *glabrata* smooth lessingia	-/-/1B.2	Serpentine; often on roadsides in chaparral and cismontane woodland. 120-420 meters	Low. Although nearest occurrence is less than 5 miles away in New Almaden, lack of serpentine soils present in Study Area.
Lomatium observatorium Mt. Hamilton lomatium	-/-/1B.2	Open to partially shaded openings in coulter pine forest and oak woodland. Typically found in sedimentary Franciscan rock and volcanics. 1219-1330 meters	Low. Suitable habitat not present in Study Area.
Madia radiata showy golden madia	-/-/1B.1	Mostly on adobe clay in grassland or among shrubs is cismontane woodland and chenopod scrub. 25-1125 meters	Low. Suitable habitat not present in Study Area.
Malacothamnus arcuatus arcuate bush-mallow	-/-/1B.2	Chaparral, needs gravelly alluvium. 1-735 meters Blooms April - September	Low. Suitable habitat not present in Study Area.
Malacothamnus hallii Hall's bush-mallow	-/-/1B.2	Chaparral and coastal scrub; steep south-facing slopes, near seeps, on thin sandy soils on sedimentary rocks, some populations on serpentine. With chamise, black sage, coyote bush, yerba santa. More abundant in burned areas. 10-730 meters	Low. Suitable habitat not present in Study Area.
Monardella sinuate ssp. nigrescens Northern curly-leaved monardella	-/-/1B.2	Coastal dunes, coastal scrub, chaparral, lower montane coniferous forest. Sandy soils. 0-300 meters.	Low. Suitable habitat not present in Study Area.
Monolopia gracilens woodland woolythreads	-/-/1B.2	Broadleaved upland forests, openings in chaparral, cismontane woodland, coastal scrub, valley and foothill grasslands. 100-915 meters	Low. Nearest occurrence near Los Alamitos Creek (New Almaden) is historical. Suitable habitat not present in Study Area.
Penstemon rattanii var. *kleei* Santa Cruz Mountains beardtounge	-/-/1B.2	Chaparral, lower montane coniferous forest, north coast coniferous forest, usually on sandy shale slopes and sometimes in the transition zone between forest and chaparral. 400-1100 meters	Low. Nearest occurrence to Study Area is historical. Suitable habitat not present in Study Area.
Pentachaeta bellidiflora white-rayed pentachaeta	-/-/1B.1	Open dry rocky slopes and grassy areas, often on soils derived from serpentine bedrock. 35-610 meters	Low. Suitable habitat not present in Study Area.

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS SPECIES			
Plants (*cont.*)			
Phacelia phacelioides Mt. Diablo phacelia	-/-/1B.2	Chaparral and cismontane woodland in rocky soils. 500-1370 meters.	Low. Suitable habitat not present in Study Area.
Plagiobothrys chorisianus var. *Chorisianus* Choris's popcorn-flower	-/-/1B.2	Mesic sites in chaparral, coastal scrub, and coastal prairie. Blooms March – June	Low. Suitable habitat not present in Study Area.
Plagiobothrys glaber hairless popcorn-flower	-/-/1A	Coastal salt marshes and swamps, alkaline meadows and seeps. 15-180 meters.	Low. Study Area lacks suitable alkaline meadows and seeps and any coastal salt marsh habitats. Species extirpated in vicinity.
Sanicula saxatilis rock sanicle	-/-/1B.2	Bedrock outcrops and talus slopes in chaparral or oak woodland habitat. 670-1250 meters	Low. Suitable habitat not present in Study Area.
Streptanthus albidus ssp. *albidus* Metcalf Canyon jewelflower	-/-/1B.1	Relatively open areas in dry grassy meadows on serpentine soils. 45-800 meters	Low. Suitable habitat not present in Study Area.
Streptanthus albidus ssp. *permoenus* most beautiful jewelflower	-/-/1B.2	Serpentine outcrops on ridges and slopes in chaparral, grassland, and cismontane woodland. 95-1000 meters	Low. New Almaden is nearest occurrence to Study Area; however, no suitable habitat present in Study Area.
Invertebrates			
Adela oplerella Opler's longhorn moth	-/-	Requires serpentine grassland, except in Santa Cruz.	Low. Nearest occurrence is less than 6 miles from Study Area, near Tulare Hill. No suitable habitat present in Study Area.
Bombus californosus Obscure bumble bee	-/-	Coastal areas from Santa Barbara county to north to Washington state. Food plant genera include Baccharis, Cirsium, Lupinus, Lotus, Grindelia and Phacelia.	Low. Suitable habitat not present in Study Area.
Bombus cotchii Crotch bumble bee	-/-	Coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum.	Low. Local occurrence is historical.
Microcina homi Hom's micro-blind harvestman	-/-	Known only from Santa Clara County in xeric habitats under serpentine rocks in grassland habitats.	Low. Suitable habitat not present in Study Area.

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OTHER SPECIAL STATUS SPECIES			
Amphibians			
Rana boyii foothill yellow-legged frog	-/SSC	Partly-shaded, shallow streams and riffles with rocky substrate in a variety of habitats. Need at least some cobble-sized substrate for egg-laying.	Moderate. Nearest occurrence is downstream of Guadalupe Reservoir, less than 2.5 miles from Study Area. Marginal habitat is present within Study Area.
Dicamptodon ensatus California giant salamander	-/-	Known from wet coastal forests near streams and seeps from Mendocino Co. south to Monterey Co. and east to Napa Co. Aquatic larvae found in cold, clear streams, occasionally in lakes and ponds. Adults known from wet forests under rocks and logs near streams and lakes.	Low. Local occurrence is historical.
Aneides flavipunctatus niger Santa Crux black salamander	-/SSC	Occurs in mixed deciduous woodland, coniferous forests, coastal grasslands. Found under rocks near streams, in talus, under damp logs, and other objects.	Low. Local occurrence within 1/3 mile of the southern end of the Study Area in 1993 prior to construction of golf course in this area. All other recent regional occurrences located within Santa Cruz hills.
Reptiles			
Emys marmorata Western pond turtle	-/SSC	The western pond turtle is uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest and absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries. Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests. Nests are typically constructed in upland habitat within 0.25 mile of aquatic habitat.	High. Suitable habitat present in Almaden Lake and the lake island. Species is known to occur in the Study Area.
Phrynosoma blainvillii coast horned lizard	-/SSC/-	Patchy open areas with sandy soils and available ant food sources. Common in lowlands along sandy washes with low bushes.	Low. Nearest occurrence located in Calero County Park, near reservoir, approximately 5 miles south of Study Area. Suitable habitat not present in Study Area.
Mammals			
Antrozous pallidus pallid bat	-/SSC/WBWG High	Deserts, grasslands, shrublands, woodlands & forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Low. Only historical occurrences documented. Suitable habitat not present in Study Area.
Corynorhinus townsendii Townsend's big-eared bat	-/SSC (State Candidate Threatened)/ WBWG High	Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limited and extremely sensitive to human disturbance.	Low. Study Area in public setting therefore existing disturbance does not present suitable habitat for species.

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS SPECIES			
Mammals (*cont.*)			
Dipodomys venustus venustus Santa Cruz kangaroo rat	-/-	Requires well-drained, deep soils, such as the Zayante sand hills of Santa Cruz County, in chaparral or foothill woodland habitats. Diet is almost completely comprised of seeds from annual plants.	Low. Study Area soils not suitable to support species.
Lasthenia conjugens hoary bat	-/-/WBWG Medium	Prefers open habitats or habitat mosaics, with access to trees for cover & open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	Moderate. Nearest occurrence of hoary bat is at an undocumented location in San Jose; although, hoary bats could seek roost in dense foliage found along Alamitos Creek.
Myotis evotis long-eared myotis	-/-/WBWG Medium	Found in all brush, woodland & forest habitats from sea level to about 9000 ft. Prefers coniferous woodlands and forests. Nursery colonies in buildings, crevices, spaces under bark.	Low. Suitable habitat not present in Study Area.
Myotis yumanensis Yuma myotis	-/-/WBWG Low-Medium	Distribution is closely tied to bodies of water. Optimal habitats are found in open forests and woodlands with sources of water for feeding. Maternity colonies in caves, mines, buildings, or crevices.	Moderate. Only occurrence is south of New Almaden, approximately six miles south of the Study Area; although, abundance of water features in the Study Area could provide suitable habitat.
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	-/SSC	Forest habitats of moderate canopy and moderate to dense understory. Constructions nests of sticks, leaves, shredded grass, and other materials, and presence may be limited by availability of nest-building materials.	Low. Although nearest occurrence of San Francisco dusky-footed woodrat midden is approximately 10 miles east of the Study Area; Study Area not suitable to support species.
Taxidea taxus American badger	-/SSC	Occupies a diversity of habitats throughout the state; principal habitat requirements include sufficient prey base, friable soils, and relatively open, uncultivated ground.	Low. Much of the Study Area is disturbed. Habitat patches exist in the Study, but are highly fragmented and subject to disturbance from human activity.
Birds			
Accipiter cooperii Cooper's hawk (nesting)	-/WL	Present in open woodlands, often nesting in deciduous riparian trees.	Moderate. May occur in the Study Area riparian areas on a transient basis. Mature sycamore and oak and other riparian vegetation in Alamitos Creek provide nesting and foraging habitat for this species.
Agelaius tricolor tricolored blackbird	-/SSC (Federal and State Candidate Threatened)	Breeds at scattered coastal locations from Marin County south to San Diego County; and at scattered locations in Lake, Sonoma, and Solano Counties. Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grainfields. Habitat must be large enough to support 50 pairs. Likely requires water at or near the nesting colony.	Moderate (foraging only). May occur over the Study Area on a transient basis. Limited suitable nesting habitat in Study Area.

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS SPECIES			
Birds (*cont*.)			
Ardea alba great egret (nesting colony)	-/§3503	Nest colonially in groves of trees. Rookery sites located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes.	Moderate. Documented as historically nesting on Almaden Lake island and east portion of lake (SCVAS, 2014).
Ardea herodias great blue heron (nesting colony)	-/§3503	Nests in suitable habitat throughout California except at higher elevations in Sierra Nevada and Cascade mountain ranges. Widely distributed in freshwater and calm-water intertidal habitats.	High. Nesting colonies known to occur on lake island.
Athene cunicularia western burrowing owl	-/SSC/BCC	Present in open annual grasslands with abundance of small mammal burrows for nesting.	Low. Suitable habitat not present.
Chaetura vauxi Vaux's swift	-/SSC	Open sky over forest, lakes, and rivers. Often feeds low over water, especially in morning and evening or during unsettled weather. Nests in coniferous and mixed forest, mainly old-growth forest, including redwood, Douglas-fir, grand fir.	Low. Lack of dense coniferous habitat likely precludes breeding within Study Area; however, migratory occurrence recorded in 2005 (SCVAS, 2005).
Cypseloides niger black swift	-/SSC	Coastal belt of Santa Cruz and Monterey Co.; central & southern Sierra Nevada; San Bernardino & San Jacinto Mountains. Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above the surf; forages widely.	Low. Nearest occurrence in New Almaden, less than 5 miles south of Study Area. No suitable habitat present in Study Area.
Egretta thula snowy egret (nesting colony)	-/§3503	Colonial nester, with nest sites situated in protected beds of dense tules. Rookery sites situated close to foraging areas: marshes, tidal-flats, streams, wet meadows, and borders of lakes.	Moderate. Documented as historically nesting on Almaden Lake island (SCVAS, 2014).
Panidon haliaetus osprey	-/WL	Ocean shore, bays, freshwater lakes, and larger streams or other areas near good fish-producing water bodies.	Low. No suitable habitat present in Study Area.
Progne subis purple martin	-/SSC	Inhabits woodlands, low elevation coniferous forest of Douglas-fir, ponderosa pine, & Monterey pine. Nests in old woodpecker cavities mostly, also in human-made structures. Nest often located in tall, isolated tree/snag.	Low. Nearest occurrence to Study Area is over 5 miles south near Mt. Umunhum. No suitable habitat present in Study Area.
Phalacrocorax auritus double-crested cormorant	-/WL	Rookery breeder in coastal areas and inland lakes in fresh, saline, and estuarine waters.	Moderate. Marginal habitat present in the Study Area.
Nycticorax nycticorax black-crowned night heron	-/§3503	Lowland and foothill areas. Nests in dense emergent wetlands and dense-foliaged trees.	Moderate. Documented as historically nesting on Almaden Lake island (SCVAS, 2014).

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Notes:
Potential Occurrence in the Project region:
High = Species is expected to occur and habitat meets species requirements.
Moderate = Habitat is only marginally suitable or is suitable but not within species geographic range.
Low = Habitat does not meet species requirements as currently understood in the scientific community.

California Rare Plant Rank (CRPR):
Rank 1A = Plants presumed extirpated in California and either rare or extinct elsewhere.
Rank 1B = Plants rare, threatened, or endangered in California and elsewhere.
Rank 2A = Plants presumed extirpated in California, but more common elsewhere.
Rank 2B = Plants rare, threatened, or endangered in California, but more common elsewhere.
Rank 3 = Plants about which we need more information – a review list
Rank 4 = Plants of limited distribution – a watch list

An extension reflecting the level of threat to each species is appended to each rarity category as follows:
.1 – Seriously endangered in California.
.2 – Fairly endangered in California.
.3 – Not very endangered in California.

Status Codes:
Federal
E = listed as endangered under the ESA
T = listed as threatened under the ESA
BCC = United States Fish and Wildlife designated “birds of conservation concern”
DL = delisted
– = no listing
State
E = listed as endangered under CESA
T = listed as threatened under CESA
SSC = California Department of Fish and Wildlife designated “species of special concern”
DL = delisted
CFP = California Department of Fish and Wildlife designated “fully protected”
– = no listing

SOURCE: USFWS, 2019; CDFW, 2019b; and CNPS, 2019

C.2 California Department of Fish and Wildlife: California Natural Diversity Database

ESA

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Laurel (3712118) OR Lick Observatory (3712136) OR Loma Prieta (3712117) OR Los Gatos (3712128) OR Morgan Hill (3712126) OR Mt. Madonna (3712116) OR San Jose East (3712137) OR San Jose West (3712138) OR Santa Teresa Hills (3712127))

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Accipiter cooperii Cooper's hawk	G5 S4	None None	CDFW_WL-Watch List IUCN_LC-Least Concern	175 175	117 S:1	0	0	1	0	0	0	0	1	1	0	0
Adela oplerella Opler's longhorn moth	G2 S2	None None		450 725	14 S:9	0	5	1	0	0	3	8	1	9	0	0
Agelaius tricolor tricolored blackbird	G2G3 S1S2	None Threatened	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_EN-Endangered NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	127 1,584	955 S:5	0	0	0	1	0	4	4	1	5	0	0
Ambystoma californiense California tiger salamander	G2G3 S2S3	Threatened Threatened	CDFW_WL-Watch List IUCN_VU-Vulnerable	85 3,500	1196 S:91	22	22	14	1	17	15	30	61	74	4	13
Ammodramus savannarum grasshopper sparrow	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	454 454	27 S:1	0	0	0	0	0	1	0	1	1	0	0
Amsinckia lunaris bent-flowered fiddleneck	G3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	750 2,600	93 S:3	0	1	0	0	0	2	2	1	3	0	0
Aneides flavipunctatus niger Santa Cruz black salamander	G3 S3	None None	CDFW_SSC-Species of Special Concern	255 2,200	78 S:31	3	0	0	0	0	28	18	13	31	0	0
Anniella pulchra northern California legless lizard	G3 S3	None None	CDFW_SSC-Species of Special Concern USFS_S-Sensitive	90 90	375 S:1	0	0	0	0	1	0	1	0	0	1	0
Anodonta californiensis California floater	G3Q S2?	None None	USFS_S-Sensitive	251 251	6 S:1	0	0	0	0	0	1	1	0	1	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Antrozous pallidus pallid bat	G5 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	90 950	419 S:9	1	3	1	0	1	3	2	7	8	1	0
Aquila chrysaetos golden eagle	G5 S3	None None	BLM_S-Sensitive CDF_S-Sensitive CDFW_FP-Fully Protected CDFW_WL-Watch List IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	460 2,744	321 S:6	1	0	0	0	0	5	3	3	6	0	0
Arctostaphylos andersonii Anderson's manzanita	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	314 2,200	64 S:17	0	3	5	2	1	6	4	13	16	1	0
Arctostaphylos silvicola Bonny Doon manzanita	G1 S1	None None	Rare Plant Rank - 1B.2	800 800	16 S:2	0	0	0	0	0	2	2	0	2	0	0
Ardea alba great egret	G5 S4	None None	CDF_S-Sensitive IUCN_LC-Least Concern	190 190	43 S:1	0	0	0	0	0	1	0	1	1	0	0
Ardea herodias great blue heron	G5 S4	None None	CDF_S-Sensitive IUCN_LC-Least Concern	190 537	155 S:4	0	0	1	0	0	3	2	2	4	0	0
Athene cunicularia burrowing owl	G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	40 1,279	1984 S:29	3	7	5	3	3	8	11	18	26	3	0
Balsamorhiza macrolepis big-scale balsamroot	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive USFS_S-Sensitive	300 300	51 S:1	0	0	0	0	0	1	0	1	1	0	0
Bombus caliginosus obscure bumble bee	G4? S1S2	None None	IUCN_VU-Vulnerable	100 3,000	181 S:7	0	0	0	0	0	7	7	0	7	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Bombus crotchii Crotch bumble bee	G3G4 S1S2	None None		100 4,000	234 S:2	0	0	0	0	0	2	2	0	2	0	0
Bombus occidentalis western bumble bee	G2G3 S1	None None	USFS_S-Sensitive XERCES_IM-Imperiled	100 500	282 S:4	0	0	0	0	0	4	4	0	4	0	0
Buteo swainsoni Swainson's hawk	G5 S3	None Threatened	BLM_S-Sensitive IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	50 272	2475 S:2	0	1	0	0	1	0	1	1	1	1	0
Calasellus californicus An isopod	G2 S2	None None		730 730	3 S:1	0	0	0	0	0	1	1	0	1	0	0
Calyptridium parryi var. hesseae Santa Cruz Mountains pussypaws	G3G4T2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	2,800 3,500	11 S:2	0	0	0	0	0	2	2	0	2	0	0
Campanula exigua chaparral harebell	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	2,022 4,100	50 S:3	0	0	1	0	0	2	2	1	3	0	0
Carex comosa bristly sedge	G5 S2	None None	Rare Plant Rank - 2B.1	1,420 1,420	29 S:1	0	0	0	0	0	1	1	0	1	0	0
Castilleja affinis var. neglecta Tiburon paintbrush	G4G5T1T2 S1S2	Endangered Threatened	Rare Plant Rank - 1B.2 SB_UCBBG-UC Berkeley Botanical Garden	965 1,300	7 S:2	1	1	0	0	0	0	0	2	2	0	0
Castilleja rubicundula var. rubicundula pink creamsacs	G5T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	540 540	38 S:1	0	0	0	0	0	1	1	0	1	0	0
Ceanothus ferrisiae Coyote ceanothus	G1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	500 1,500	4 S:4	1	1	0	1	0	1	1	3	4	0	0
Centromadia parryi ssp. congdonii Congdon's tarplant	G3T1T2 S1S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	100 100	98 S:1	0	0	0	0	1	0	1	0	0	0	1

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Chlorogalum pomeridianum var. minus dwarf soaproot	G5T3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_SBBG-Santa Barbara Botanic Garden USFS_S-Sensitive		31 S:1	0	0	0	0	0	1	1	0	1	0	0
Chorizanthe pungens var. hartwegiana Ben Lomond spineflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1	350 1,000	18 S:3	0	0	1	0	1	1	3	0	2	1	0
Chorizanthe pungens var. pungens Monterey spineflower	G2T2 S2	Threatened None	Rare Plant Rank - 1B.2 SB_UCBBG-UC Berkeley Botanical Garden	550 875	51 S:3	0	0	2	0	0	1	1	2	3	0	0
Chorizanthe robusta var. hartwegii Scotts Valley spineflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1	750 750	4 S:2	0	2	0	0	0	0	0	2	2	0	0
Chorizanthe robusta var. robusta robust spineflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	350 500	20 S:4	0	0	0	0	2	2	3	1	2	2	0
Cicindela ohlone Ohlone tiger beetle	G1 S1	Endangered None		715 715	6 S:1	0	0	0	0	0	1	0	1	1	0	0
Cirsium fontinale var. campylon Mt. Hamilton fountain thistle	G2T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	250 2,800	36 S:28	6	13	3	0	0	6	7	21	28	0	0
Clarkia concinna ssp. automixa Santa Clara red ribbons	G5?T3 S3	None None	Rare Plant Rank - 4.3	300 3,000	20 S:6	0	1	0	0	0	5	6	0	6	0	0
Collinsia multicolor San Francisco collinsia	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	200 200	36 S:2	0	0	0	0	0	2	2	0	2	0	0
Corynorhinus townsendii Townsend's big-eared bat	G3G4 S2	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	90 1,040	629 S:7	0	2	1	0	0	4	3	4	7	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Coturnicops noveboracensis yellow rail	G4 S1S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern NABCI_RWL-Red Watch List USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	85 100	45 S:2	0	0	0	1	0	1	2	0	2	0	0
Cypseloides niger black swift	G4 S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern NABCI_YWL-Yellow Watch List USFWS_BCC-Birds of Conservation Concern	520 520	46 S:1	0	0	0	0	0	1	1	0	1	0	0
Dicamptodon ensatus California giant salamander	G3 S2S3	None None	CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened	100 2,200	234 S:27	1	5	0	0	0	21	11	16	27	0	0
Dipodomys venustus venustus Santa Cruz kangaroo rat	G4T1 S1	None None		853 2,170	29 S:5	0	0	0	0	2	3	5	0	3	2	0
Dudleya abramsii ssp. setchellii Santa Clara Valley dudleya	G4T2 S2	Endangered None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	250 1,700	58 S:52	15	19	7	3	0	8	6	46	52	0	0
Egretta thula snowy egret	G5 S4	None None	IUCN_LC-Least Concern	190 190	20 S:1	0	0	0	0	0	1	0	1	1	0	0
Elanus leucurus white-tailed kite	G5 S3S4	None None	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_LC-Least Concern	274 1,009	180 S:8	2	0	0	0	0	6	0	8	8	0	0
Emys marmorata western pond turtle	G3G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable USFS_S-Sensitive	100 2,000	1369 S:53	9	14	11	1	0	18	16	37	53	0	0
Eriogonum nudum var. decurrens Ben Lomond buckwheat	G5T1 S1	None None	Rare Plant Rank - 1B.1		9 S:1	0	0	0	0	0	1	1	0	1	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Eryngium aristulatum var. hooveri Hoover's button-celery	G5T1 S1	None None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden		16 S:1	0	0	0	0	0	1	0	1	1	0	0
Erysimum teretifolium Santa Cruz wallflower	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1	950 1,000	15 S:2	0	0	0	0	2	0	2	0	0	1	1
Euphilotes enoptes smithi Smith's blue butterfly	G5T1T2 S1S2	Endangered None	XERCES_CI-Critically Imperiled	2,976 2,976	68 S:1	0	0	0	0	0	1	0	1	1	0	0
Euphydryas editha bayensis Bay checkerspot butterfly	G5T1 S1	Threatened None	XERCES_CI-Critically Imperiled	450 1,322	30 S:16	0	7	1	0	1	7	5	11	15	1	0
Falco peregrinus anatum American peregrine falcon	G4T4 S3S4	Delisted Delisted	CDF_S-Sensitive CDFW_FP-Fully Protected USFWS_BCC-Birds of Conservation Concern	85 85	56 S:1	0	0	0	0	0	1	0	1	1	0	0
Fissidens pauperculus minute pocket moss	G3? S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	360 360	22 S:1	0	0	0	0	0	1	0	1	1	0	0
Fritillaria liliacea fragrant fritillary	G2 S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	340 1,260	82 S:10	1	0	5	1	0	3	4	6	10	0	0
Hoita strobilina Loma Prieta hoita	G2? S2?	None None	Rare Plant Rank - 1B.1	400 3,200	34 S:29	9	10	9	0	0	1	1	28	29	0	0
Holocarpha macradenia Santa Cruz tarplant	G1 S1	Threatened Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	330 400	37 S:2	1	0	0	1	0	0	2	0	2	0	0
Horkelia cuneata var. sericea Kellogg's horkelia	G4T1? S1?	None None	Rare Plant Rank - 1B.1 USFS_S-Sensitive		58 S:1	0	0	0	0	0	1	1	0	1	0	0
Icteria virens yellow-breasted chat	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	247 247	99 S:1	0	0	0	0	0	1	0	1	1	0	0
Lanius ludovicianus loggerhead shrike	G4 S4	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	258 258	110 S:1	0	0	0	0	0	1	0	1	1	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Lasiurus cinereus hoary bat	G5 S4	None None	IUCN_LC-Least Concern WBWG_M-Medium Priority		238 S:3	0	0	0	0	0	3	3	0	3	0	0
Lasthenia conjugens Contra Costa goldfields	G1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_UCBBG-UC Berkeley Botanical Garden	50 110	36 S:2	0	0	0	0	2	0	2	0	0	0	2
Lavinia symmetricus subditus Monterey roach	G4T2T3 S2S3	None None	CDFW_SSC-Species of Special Concern	570 570	6 S:1	0	0	1	0	0	0	0	1	1	0	0
Leptosyne hamiltonii Mt. Hamilton coreopsis	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	4,200 4,200	21 S:1	0	1	0	0	0	0	1	0	1	0	0
Lessingia micradenia var. glabrata smooth lessingia	G2T2 S2	None None	Rare Plant Rank - 1B.2	300 1,600	44 S:42	12	16	4	0	0	10	6	36	42	0	0
Lomatium observatorium Mt. Hamilton lomatium	G1 S1	None None	Rare Plant Rank - 1B.2	4,000 4,000	4 S:2	0	0	0	0	0	2	2	0	2	0	0
Malacothamnus arcuatus arcuate bush-mallow	G2Q S2	None None	Rare Plant Rank - 1B.2	270 2,170	30 S:12	2	1	4	0	0	5	7	5	12	0	0
Malacothamnus hallii Hall's bush-mallow	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	40 1,100	36 S:17	0	6	4	2	1	4	2	15	16	1	0
Microcina homi Hom's micro-blind harvestman	G1 S1	None None		236 860	5 S:5	0	0	0	0	0	5	5	0	5	0	0
Microcina jungi Jung's micro-blind harvestman	G1 S1	None None		700 700	1 S:1	0	0	0	0	0	1	1	0	1	0	0
Monardella sinuata ssp. nigrescens northern curly-leaved monardella	G3T2 S2	None None	Rare Plant Rank - 1B.2		25 S:1	0	0	0	0	0	1	1	0	1	0	0
Monolopia gracilens woodland woollythreads	G3 S3	None None	Rare Plant Rank - 1B.2	450 3,200	68 S:27	3	9	1	0	1	13	9	18	26	1	0
Myotis evotis long-eared myotis	G5 S3	None None	BLM_S-Sensitive IUCN_LC-Least Concern WBWG_M-Medium Priority	570 570	139 S:1	0	0	1	0	0	0	0	1	1	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

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Myotis yumanensis Yuma myotis	G5 S4	None None	BLM_S-Sensitive IUCN_LC-Least Concern WBWG_LM-Low-Medium Priority	1,100 1,100	265 S:1	0	0	0	0	0	1	0	1	1	0	0
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	G5T2T3 S2S3	None None	CDFW_SSC-Species of Special Concern	190 1,135	38 S:17	2	4	6	2	0	3	0	17	17	0	0
North Central Coast Drainage Sacramento Sucker/Roach River North Central Coast Drainage Sacramento Sucker/Roach River	GNR SNR	None None		400 400	4 S:1	0	1	0	0	0	0	1	0	1	0	0
Northern Maritime Chaparral Northern Maritime Chaparral	G1 S1.2	None None		900 900	17 S:1	0	0	0	0	0	1	1	0	1	0	0
Nycticorax nycticorax black-crowned night heron	G5 S4	None None	IUCN_LC-Least Concern	190 190	37 S:1	0	0	0	0	0	1	0	1	1	0	0
Oncorhynchus kisutch pop. 4 coho salmon - central California coast ESU	G4 S2?	Endangered Endangered	AFS_EN-Endangered	400 400	23 S:1	0	0	0	1	0	0	1	0	1	0	0
Oncorhynchus mykiss irideus pop. 8 steelhead - central California coast DPS	G5T2T3Q S2S3	Threatened None	AFS_TH-Threatened	40 400	44 S:5	0	1	0	1	0	3	2	3	5	0	0
Oncorhynchus mykiss irideus pop. 9 steelhead - south-central California coast DPS	G5T2Q S2	Threatened None	AFS_TH-Threatened	240 400	32 S:3	0	0	0	0	0	3	3	0	3	0	0
Pandion haliaetus osprey	G5 S4	None None	CDF_S-Sensitive CDFW_WL-Watch List IUCN_LC-Least Concern	1,020 1,270	500 S:3	0	3	0	0	0	0	0	3	3	0	0
Penstemon rattanii var. kleei Santa Cruz Mountains beardtongue	G4T2 S2	None None	Rare Plant Rank - 1B.2	1,500 3,000	6 S:3	0	0	0	0	0	3	3	0	3	0	0
Pentachaeta bellidiflora white-rayed pentachaeta	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_UCBBG-UC Berkeley Botanical Garden		14 S:1	0	0	0	0	1	0	1	0	0	1	0
Phacelia phacelioides Mt. Diablo phacelia	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	4,200 4,200	16 S:1	0	0	0	0	0	1	1	0	1	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

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Phrynosoma blainvillii coast horned lizard	G3G4 S3S4	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	350 4,240	780 S:5	0	2	2	0	0	1	2	3	5	0	0
Plagiobothrys chorisianus var. chorisianus Choris' popcornflower	G3T1Q S1	None None	Rare Plant Rank - 1B.2	700 700	42 S:1	0	0	0	0	0	1	0	1	1	0	0
Plagiobothrys diffusus San Francisco popcornflower	G1Q S1	None Endangered	Rare Plant Rank - 1B.1	400 750	17 S:2	0	1	1	0	0	0	2	0	2	0	0
Plagiobothrys glaber hairless popcornflower	GH SH	None None	Rare Plant Rank - 1A	50 400	9 S:3	0	0	0	0	3	0	3	0	0	3	0
Polygonum hickmanii Scotts Valley polygonum	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1	750 750	2 S:1	0	1	0	0	0	0	0	1	1	0	0
Progne subis purple martin	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	3,486 3,486	71 S:1	0	0	0	0	0	1	0	1	1	0	0
Rana boylii foothill yellow-legged frog	G3 S3	None Candidate Threatened	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened USFS_S-Sensitive	100 2,500	2381 S:32	4	6	1	0	4	17	16	16	28	0	4
Rana draytonii California red-legged frog	G2G3 S2S3	Threatened None	CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	222 2,585	1527 S:66	14	19	6	1	2	24	20	46	64	2	0
Sanicula saxatilis rock sanicle	G2 S2	None Rare	Rare Plant Rank - 1B.2 BLM_S-Sensitive	2,800 4,100	9 S:3	2	1	0	0	0	0	1	2	3	0	0
Senecio aphanactis chaparral ragwort	G3 S2	None None	Rare Plant Rank - 2B.2		82 S:1	0	0	0	0	0	1	1	0	1	0	0
Serpentine Bunchgrass Serpentine Bunchgrass	G2 S2.2	None None		480 900	22 S:4	0	1	0	1	0	2	4	0	4	0	0
Streptanthus albidus ssp. albidus Metcalf Canyon jewelflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	170 900	13 S:13	0	7	2	2	1	1	2	11	12	0	1

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

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Streptanthus albidus ssp. peramoenus most beautiful jewelflower	G2T2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive	400 3,400	103 S:42	7	17	3	1	0	14	3	39	42	0	0
Sycamore Alluvial Woodland Sycamore Alluvial Woodland	G1 S1.1	None None		320 320	17 S:1	0	0	1	0	0	0	1	0	1	0	0
Taxidea taxus American badger	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	216 891	590 S:16	1	4	0	1	0	10	0	16	16	0	0
Trifolium buckwestiorum Santa Cruz clover	G2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_USDA-US Dept of Agriculture	1,890 2,325	58 S:2	0	0	1	1	0	0	1	1	2	0	0
Trifolium hydrophilum saline clover	G2 S2	None None	Rare Plant Rank - 1B.2		49 S:1	0	0	0	0	0	1	1	0	1	0	0
Trifolium polyodon Pacific Grove clover	G1 S1	None Rare	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_USDA-US Dept of Agriculture	695 695	21 S:1	0	0	0	0	0	1	0	1	1	0	0
Trimerotropis infantilis Zayante band-winged grasshopper	G1 S1	Endangered None	IUCN_EN-Endangered	100 800	6 S:2	0	0	0	0	1	1	2	0	1	0	1
Vulpes macrotis mutica San Joaquin kit fox	G4T2 S2	Endangered Threatened		1,220 1,220	1018 S:1	0	0	0	0	0	1	1	0	1	0	0

C.3 California Native Plant Society: Rare Plant Program Inventory of Rare and Endangered Plants

ESA

California Native Plant Society (CNPS), CNPS, 2019. Rare Plant Program Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.45) for 7.5 minute Topographic Quadrangles Laurel, Lick Observatory, Loma Prieta, Morgan Hill, Mt. Madonna, San José East, San José West, Santa Teresa Hills, and Los Gatos. Website http://www.rareplants.cnps.org [accessed 2 February 2019].

Scientific Name	Common Name	Family	Lifeform	CRPR	CESA	FESA	Blooming Period	Habitat	Micro Habitat	Elevation Low (ft)	Elevation High (ft)
Acanthomintha lanceolata	Santa Clara thorn-mint	Lamiaceae	annual herb	4.2	None	None	Mar-Jun	Chaparral (often serpentinite), Cismontane woodland, Coastal scrub	rocky	260	3935
Amsinckia lunaris	bent-flowered fiddleneck	Boraginaceae	annual herb	1B.2	None	None	Mar-Jun	Coastal bluff scrub, Cismontane woodland, Valley and foothill grassland		5	1640
Androsace elongata ssp. acuta	California androsace	Primulaceae	annual herb perennial	4.2	None	None	Mar-Jun	Chaparral, Cismontane woodland, Coastal scrub, Meadows and seeps, Pinyon and juniper woodland, Valley and foothill grassland		490	4280
Arctostaphylos andersonii	Anderson's manzanita	Ericaceae	evergreen shrub	1B.2	None	None	Nov-May	Broadleafed upland forest, Chaparral, North Coast coniferous forest	openings, edges	195	2495
Arctostaphylos silvicola	Bonny Doon manzanita	Ericaceae	perennial evergreen shrub	1B.2	None	None	Jan-Mar	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest	inland marine sands	390	1970
Balsamorhiza macrolepis	big-scale balsamroot	Asteraceae	perennial herb	1B.2	None	None	Mar-Jun	Chaparral, Cismontane woodland, Valley and foothill grassland	sometimes serpentinite	145	5100
Calandrinia breweri	Brewer's calandrinia	Montiaceae	annual herb	4.2	None	None	(Jan)Mar-Jun	Chaparral, Coastal scrub	sandy or loamy, disturbed sites and burns	30	4005
Calochortus umbellatus	Oakland star-tulip	Liliaceae	perennial bulbiferous herb	4.2	None	None	Mar-May	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland	often serpentinite	325	2295
Calyptridium parryi var. hesseae	Santa Cruz Mountains pussypaws	Montiaceae	annual herb	1B.1	None	None	May-Aug	Chaparral, Cismontane woodland	sandy or gravelly, openings	1000	5020
Calystegia collina ssp. venusta	South Coast Range morning-glory	Convolvulaceae	perennial rhizomatous herb	4.3	None	None	Apr-Jun	Chaparral, Cismontane woodland, Valley and foothill grassland	serpentinite or sedimentary	1390	4890
Campanula exigua	chaparral harebell	Campanulaceae	annual herb	1B.2	None	None	May-Jun	Chaparral (rocky, usually serpentinite)		900	4100
Carex comosa	bristly sedge	Cyperaceae	perennial rhizomatous herb	2B.1	None	None	May-Sep	Coastal prairie, Marshes and swamps (lake margins), Valley and foothill grassland		0	2050

Carex saliniformis	deceiving sedge	Cyperaceae	perennial rhizomatous herb	1B.2	None	None	Jun(Jul)	Coastal prairie, Coastal scrub, Meadows and seeps, Marshes and swamps (coastal salt)	mesic	5	755
Castilleja affinis var. neglecta	Tiburon paintbrush	Orobanchaceae	perennial herb (hemiparasitic)	1B.2	CT	FE	Apr-Jun	Valley and foothill grassland (serpentinite)		195	1310
Castilleja rubicundula var. rubicundula	pink creamsacs	Orobanchaceae	annual herb (hemiparasitic)	1B.2	None	None	Apr-Jun	Chaparral (openings), Cismontane woodland, Meadows and seeps, Valley and foothill grassland	serpentinite	65	2985
Ceanothus ferrisiae	Coyote ceanothus	Rhamnaceae	perennial evergreen shrub	1B.1	None	FE	Jan-May	Chaparral, Coastal scrub, Valley and foothill grassland	serpentinite	390	1510
Centromadia parryi ssp. congdonii	Congdon's tarplant	Asteraceae	annual herb	1B.1	None	None	May-Oct(Nov)	Valley and foothill grassland (alkaline)		0	755
Chlorogalum pomeridianum var. minus	dwarf soaproot	Agavaceae	perennial bulbiferous herb	1B.2	None	None	May-Aug	Chaparral (serpentinite)		1000	3280
Chorizanthe douglasii	Douglas' spineflower	Polygonaceae	annual herb	4.3	None	None	Apr-Jul	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland	sandy or gravelly	180	5250
Chorizanthe pungens var. hartwegiana	Ben Lomond spineflower	Polygonaceae	annual herb	1B.1	None	FE	Apr-Jul	Lower montane coniferous forest (maritime ponderosa pine sandhills)		295	2000
Chorizanthe pungens var. pungens	Monterey spineflower	Polygonaceae	annual herb	1B.2	None	FT	Apr-Jun(Jul-Aug)	Chaparral (maritime), Cismontane woodland, Coastal dunes, Coastal scrub, Valley and foothill grassland	sandy	5	1475
Chorizanthe robusta var. hartwegii	Scotts Valley spineflower	Polygonaceae	annual herb	1B.1	None	FE	Apr-Jul	Meadows and seeps (sandy), Valley and foothill grassland (mudstone and Purisima outcrops)		750	805
Chorizanthe robusta var. robusta	robust spineflower	Polygonaceae	annual herb	1B.1	None	FE	Apr-Sep	Chaparral (maritime), Cismontane woodland (openings), Coastal dunes, Coastal scrub	sandy or gravelly	5	985
Cirsium fontinale var. campylon	Mt. Hamilton fountain thistle	Asteraceae	perennial herb	1B.2	None	None	(Feb)Apr-Oct	Chaparral, Cismontane woodland, Valley and foothill grassland	serpentinite seeps	325	2920

Clarkia breweri	Brewer's clarkia	Onagraceae	annual herb	4.2	None	None	Apr-Jun	Chaparral, Cismontane woodland, Coastal scrub	often serpentinite	705	3660
Clarkia concinna ssp. automixa	Santa Clara red ribbons	Onagraceae	annual herb	4.3	None	None	(Apr)May-Jun(Jul)	Chaparral, Cismontane woodland		295	4920
Clarkia lewisii	Lewis' clarkia	Onagraceae	annual herb	4.3	None	None	May-Jul	Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coastal scrub		95	3920
Collinsia multicolor	San Francisco collinsia	Plantaginaceae	annual herb	1B.2	None	None	(Feb)Mar-May	Closed-cone coniferous forest, Coastal scrub	sometimes serpentinite	95	820
Cypripedium fasciculatum	clustered lady's-slipper	Orchidaceae	perennial rhizomatous herb	4.2	None	None	Mar-Aug	Lower montane coniferous forest, North Coast coniferous forest	usually serpentinite seeps and streambanks	325	7990
Cypripedium montanum	mountain lady's-slipper	Orchidaceae	perennial rhizomatous herb	4.2	None	None	Mar-Aug	Broadleafed upland forest, Cismontane woodland, Lower montane coniferous forest, North Coast coniferous forest		605	7300
Dudleya abramsii ssp. setchellii	Santa Clara Valley dudleya	Crassulaceae	perennial herb	1B.1	None	FE	Apr-Oct	Cismontane woodland, Valley and foothill grassland	serpentinite, rocky	195	1495
Elymus californicus	California bottle-brush grass	Poaceae	perennial herb	4.3	None	None	May-Aug(Nov)	Broadleafed upland forest, Cismontane woodland, North Coast coniferous forest, Riparian woodland		45	1540
Eriogonum nudum var. decurrens	Ben Lomond buckwheat	Polygonaceae	perennial herb	1B.1	None	None	Jun-Oct	Chaparral, Cismontane woodland, Lower montane coniferous forest (maritime ponderosa pine sandhills)	sandy	160	2625
Eryngium aristulatum var. hooveri	Hoover's button-celery	Apiaceae	annual / perennial herb	1B.1	None	None	(Jun)Jul(Aug)	Vernal pools		5	150
Erysimum teretifolium	Santa Cruz wallflower	Brassicaceae	perennial herb	1B.1	CE	FE	Mar-Jul	Chaparral, Lower montane coniferous forest	inland marine sands	390	2000
Fissidens pauperculus	minute pocket moss	Fissidentaceae	moss	1B.2	None	None		North Coast coniferous forest (damp coastal soil)		30	3360

Fritillaria liliacea	fragrant fritillary	Liliaceae	perennial bulbiferous herb	1B.2	None	None	Feb-Apr	Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland	Often serpentinite	5	1345
Galium andrewsii ssp. gatense	phlox-leaf serpentine bedstraw	Rubiaceae	perennial herb	4.2	None	None	Apr-Jul	Chaparral, Cismontane woodland, Lower montane coniferous forest	serpentinite, rocky	490	4755
Hoita strobilina	Loma Prieta hoita	Fabaceae	perennial herb	1B.1	None	None	May-Jul(Aug-Oct)	Chaparral, Cismontane woodland, Riparian woodland	usually serpentinite, mesic	95	2820
Holocarpha macradenia	Santa Cruz tarplant	Asteraceae	annual herb	1B.1	CE	FT	Jun-Oct	Coastal prairie, Coastal scrub, Valley and foothill grassland	often clay, sandy	30	720
Iris longipetala	coast iris	Iridaceae	perennial rhizomatous herb	4.2	None	None	Mar-May	Coastal prairie, Lower montane coniferous forest, Meadows and seeps	mesic	0	1970
Lasthenia conjugens	Contra Costa goldfields	Asteraceae	annual herb	1B.1	None	FE	Mar-Jun	Cismontane woodland, Playas (alkaline), Valley and foothill grassland, Vernal pools	mesic	0	1540
Leptosiphon acicularis	bristly leptosiphon	Polemoniaceae	annual herb	4.2	None	None	Apr-Jul	Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland		180	4920
Leptosiphon ambiguus	serpentine leptosiphon	Polemoniaceae	annual herb	4.2	None	None	Mar-Jun	Cismontane woodland, Coastal scrub, Valley and foothill grassland	usually serpentinite	390	3705
Leptosiphon grandiflorus	large-flowered leptosiphon	Polemoniaceae	annual herb	4.2	None	None	Apr-Aug	Coastal bluff scrub, Closed-cone coniferous forest, Cismontane woodland, Coastal dunes, Coastal prairie, Coastal scrub, Valley and foothill grassland	usually sandy	15	4005
Leptosyne hamiltonii	Mt. Hamilton coreopsis	Asteraceae	annual herb	1B.2	None	None	Mar-May	Cismontane woodland (rocky)		1800	4265
Lessingia hololeuca	woolly-headed lessingia	Asteraceae	annual herb	3	None	None	Jun-Oct	Broadleafed upland forest, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland	clay, serpentinite	45	1000
Lessingia micradenia var. glabrata	smooth lessingia	Asteraceae	annual herb	1B.2	None	None	(Apr-Jun)Jul-Nov	Chaparral, Cismontane woodland, Valley and foothill grassland	serpentinite, often roadsides	390	1380

Lomatium observatorium	Mt. Hamilton lomatium	Apiaceae	perennial herb	1B.2	None	None	Mar-May	Cismontane woodland		3995	4365
Malacothamnus arcuatus	arcuate bush-mallow	Malvaceae	perennial evergreen shrub	1B.2	None	None	Apr-Sep	Chaparral, Cismontane woodland		45	1165
Malacothamnus hallii	Hall's bush-mallow	Malvaceae	perennial evergreen shrub	1B.2	None	None	(Apr)May-Sep(Oct)	Chaparral, Coastal scrub		30	2495
Micropus amphibolus	Mt. Diablo cottonweed	Asteraceae	annual herb	3.2	None	None	Mar-May	Broadleafed upland forest, Chaparral, Cismontane woodland, Valley and foothill grassland	rocky	145	2705
Monolopia gracilens	woodland woolythreads	Asteraceae	annual herb	1B.2	None	None	(Feb)Mar-Jul	Broadleafed upland forest (openings), Chaparral (openings), Cismontane woodland, North Coast coniferous forest (openings), Valley and foothill grassland	Serpentine	325	3935
Penstemon rattanii var. kleei	Santa Cruz Mountains beardtongue	Plantaginaceae	perennial herb	1B.2	None	None	May-Jun	Chaparral, Lower montane coniferous forest, North Coast coniferous forest		1310	3610
Phacelia phacelioides	Mt. Diablo phacelia	Hydrophyllaceae	annual herb	1B.2	None	None	Apr-May	Chaparral, Cismontane woodland	rocky	1640	4495
Plagiobothrys chorisianus var. chorisianus	Choris' popcornflower	Boraginaceae	annual herb	1B.2	None	None	Mar-Jun	Chaparral, Coastal prairie, Coastal scrub	mesic	5	525
Plagiobothrys chorisianus var. hickmanii	Hickman's popcornflower	Boraginaceae	annual herb	4.2	None	None	Apr-Jun	Closed-cone coniferous forest, Chaparral, Coastal scrub, Marshes and swamps, Vernal pools		45	605
Plagiobothrys diffusus	San Francisco popcornflower	Boraginaceae	annual herb	1B.1	CE	None	Mar-Jun	Coastal prairie, Valley and foothill grassland		195	1180
Plagiobothrys glaber	hairless popcornflower	Boraginaceae	annual herb	1A	None	None	Mar-May	Meadows and seeps (alkaline), Marshes and swamps (coastal salt)		45	590
Polygonum hickmanii	Scotts Valley polygonum	Polygonaceae	annual herb	1B.1	CE	FE	May-Aug	Valley and foothill grassland (mudstone and sandstone)		685	820

Ranunculus lobbii	Lobb's aquatic buttercup	Ranunculaceae	annual herb (aquatic)	4.2	None	None	Feb-May	Cismontane woodland, North Coast coniferous forest, Valley and foothill grassland, Vernal pools	mesic	45	1540
Sanicula saxatilis	rock sanicle	Apiaceae	perennial herb	1B.2	CR	None	Apr-May	Broadleafed upland forest, Chaparral, Valley and foothill grassland	rocky, scree, talus	2030	3855
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	2B.2	None	None	Jan-Apr(May)	Chaparral, Cismontane woodland, Coastal scrub	sometimes alkaline	45	2625
Sidalcea malachroides	maple-leaved checkerbloom	Malvaceae	perennial herb	4.2	None	None	(Mar)Apr-Aug	Broadleafed upland forest, Coastal prairie, Coastal scrub, North Coast coniferous forest, Riparian woodland	Often in disturbed areas	0	2395
Streptanthus albidus ssp. albidus	Metcalf Canyon jewelflower	Brassicaceae	annual herb	1B.1	None	FE	Apr-Jul	Valley and foothill grassland (serpentinite)		145	2625
Streptanthus albidus ssp. peramoenus	most beautiful jewelflower	Brassicaceae	annual herb	1B.2	None	None	(Mar)Apr-Sep(Oct)	Chaparral, Cismontane woodland, Valley and foothill grassland	serpentinite	310	3280
Trifolium buckwestiorum	Santa Cruz clover	Fabaceae	annual herb	1B.1	None	None	Apr-Oct	Broadleafed upland forest, Cismontane woodland, Coastal prairie	gravelly, margins	340	2000
Trifolium hydrophilum	saline clover	Fabaceae	annual herb	1B.2	None	None	Apr-Jun	Marshes and swamps, Valley and foothill grassland (mesic, alkaline), Vernal pools		0	985

C.4 United States Fish and Wildlife: List of Threatened and Endangered Species that May Occur in the Proposed Project Location

ESA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: February 04, 2019
Consultation Code: 08ESMF00-2016-SLI-2284
Event Code: 08ESMF00-2019-E-02639
Project Name: Almaden Lake Improvement Project

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2016-SLI-2284

Event Code: 08ESMF00-2019-E-02639

Project Name: Almaden Lake Improvement Project

Project Type: STREAM / WATERBODY / CANALS / LEVEES / DIKES

Project Description: San Jose, CA

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.23856239513955N121.87165411395027W



Counties: Santa Clara, CA

Endangered Species Act Species

There is a total of 9 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
San Joaquin Kit Fox Vulpes macrotis mutica No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2873	Endangered

Birds

NAME	STATUS
California Least Tern Sterna antillarum browni No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered
Marbled Murrelet Brachyramphus marmoratus Population: U.S.A. (CA, OR, WA) There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander Ambystoma californiense Population: U.S.A. (Central CA DPS) There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Bay Checkerspot Butterfly Euphydryas editha bayensis There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2320	Threatened

Flowering Plants

NAME	STATUS
Metcalf Canyon Jewelflower Streptanthus albidus ssp. albidus No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4186	Endangered
Santa Clara Valley Dudleya Dudleya setchellii No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3207	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

C.5 Santa Clara Valley Habitat Plan: Conditions on Covered Activities

ESA

Chapter 6

Conditions on Covered Activities and Application Process

6.1 Introduction

As required by ESA (Section 10[a][2][A][ii]) and Fish and Game Code Sections 2820 (a)(6) and 2820(f), this Plan includes measures to avoid and minimize take of covered species. These measures to avoid and minimize impacts are described as *conditions on covered activities* and are designed to achieve the objectives listed below.

- Provide avoidance of covered species during implementation of covered activities throughout the study area.
- Prevent take of individuals from covered activities as prohibited by law (e.g., take of fully protected species).
- Minimize adverse effects on natural communities and covered species where conservation actions will take place.
- Avoid and minimize impacts on jurisdictional wetlands and waters throughout the study area.

In the context of effects on covered species, one of the greatest benefits of an HCP/NCCP is that mitigation for individual projects can be implemented systematically on a regional scale. This enables a more comprehensive approach to conservation that concentrates protection where it has the greatest value. The Plan also restricts covered activities in high-value land cover types (e.g., wetlands, serpentine grassland) and for some species (e.g., covered plants and selected covered wildlife species). By protecting high-quality areas in the Reserve System and restricting covered activities in areas of higher biological value, regional avoidance and minimization goals are supported.

This chapter describes conditions on covered activities that help meet regional avoidance and minimization goals. Regional avoidance and minimization reduces the need for individual projects to avoid and minimize impacts at the project scale and allows streamlining of regulatory requirements. This Plan assumes that take will result from individual covered activities and that this take will be mitigated through the conservation strategy (Chapter 5). Most activities covered under this Plan are required to provide limited documentation of field conditions to verify these assumptions (see Section 6.2 *Exemptions from Conditions*).

Avoidance and minimization measures are regulated by federal, state, and local programs. The conditions on covered activities (avoidance and minimization measures), described in this chapter do not supersede requirements by other agencies and are not intended to provide a basis for non-compliance with other applicable design guidelines required by other federal, state, and local agencies.

This chapter also describes the application process for individual projects to request coverage under this Plan. The application process is described in detail at the end of this chapter in Sections 6.7 *Receiving Take Authorization under the Plan* and 6.8 *Habitat Plan Application Package*. The conditions on covered activities and application process are included in this chapter together so that project proponents have one location in this document in which all requirements are described.

The NCCP Act requires that the Permittees get concurrence from the Wildlife Agencies before adopting, amending, or approving any plan or project that is inconsistent with the objectives and requirements of this Plan[1]. The conditions described in this chapter are designed to ensure this consistency and provide standard and predictable requirements for project applicants. However, Permittees may need to adopt or impose additional conditions beyond those described in this chapter for unanticipated projects or effects in order to ensure consistency with the Habitat Plan and compliance with the NCCP Act. The Permittees will evaluate all projects respective to their authorities to ensure that all applicable conditions described in this chapter have been incorporated into the project prior to extending take coverage under the Plan. Chapter 8 describes applicant responsibilities in the application process.

In addition to the conditions described in this chapter to avoid and minimize impacts, covered activities may also require payment of mitigation fees (see Chapter 9), provision of land in lieu of mitigation fees (see Chapter 8), or habitat restoration or creation in lieu of wetland fees.

6.2 Exemptions from Conditions

Many projects within the study area do not disturb the ground or have little or no measurable impact on the covered species or natural communities. Because the probability of take is so low, the need to enforce conditions on the projects and activities specified below would not provide a net benefit for species. Therefore, these covered activities are not subject to the conditions described in this chapter. Quantifiable impacts associated with activities exempt from conditions of the Habitat Plan will be reported in the Application Package (see Section 6.8, below) (impacts that cannot be quantified will not be tracked). Although these covered activities are exempted from the conditions, all of them receive take coverage (**Table 6-1**).

[1] Fish and Game Code Section 2820(b)(3).

Exemptions based on land cover types are based on the mapping for this Plan at the time of permit issuance and the nature of covered activities previously permitted on the site.

Many of the covered activities exempt from the conditions in this chapter may also be exempt from the Habitat Plan fees, as described in Chapter 9, Section 9.4.1 *Habitat Plan Fees*. The association between covered activities exempt from conditions on covered activities and Habitat Plan fees are shown in **Table 6-1**.

The following activities and projects are exempt from all of the conditions in this chapter and are not tracked as impacts by the Implementing Entity (as described above)[2].

- Projects that do not result in ground disturbance do not result in release of potential water quality contaminants, or do not create new wildlife barriers.
- Private-sector, routine-maintenance activities that require a development, grading, or building permit, and that occur inside the urban service area (private-sector activities that do not require a development, grading, or building permit are not covered by the Plan or its conditions or fees).
- Private-sector, routine-maintenance activities that require a development, grading, or building permit; that occur outside of the urban service area; and that occur within 50 feet of all existing structures at the time of Plan commencement or within 50 feet of structures that were permitted for incidental take under the Habitat Plan.
- Any covered activity described in Chapter 2 that occurs in urban-suburban, landfill, reservoir[3], or agriculture developed[4] land cover types as verified in the field, unless the activity may affect a mapped or unmapped stream, riparian, serpentine, pond, or wetland land cover types, or the activity is located in a stream setback (see Condition 11 for a discussion of stream setbacks).
- Routine infrastructure maintenance by public agencies within the planning limit of urban growth that do not affect stream, riparian, serpentine, ponds, or wetland land cover types.
- Routine infrastructure maintenance by public agencies that occurs in urban-suburban, landfill, reservoir, or agriculture developed land cover types that do not affect stream, riparian, serpentine, pond, or wetland land cover types. Examples of such activities include filling pot-holes and resurfacing existing roads without expansion of the paved area.

[2] Project proponents are still required to comply with survey and avoidance requirements for applicable local, state, and federal laws not addressed by the Habitat Plan (e.g., local tree ordinances, state fully protected species, the federal Migratory Bird Treaty Act).
[3] "Reservoir" does not include the dam face. Exemptions described in this chapter do not apply to projects impacting the face of covered dams.
[4] The land cover type "agriculture developed" (also known as agriculture developed/covered ag) is defined in Chapter 3 as intensive agricultural operations such as nurseries and greenhouses.

The following activities[5] are also exempt from all conditions in this chapter but will be tracked by the Implementing Entity as impacts when they occur on natural land cover types.

- Additions to existing structures or new structures that are within 50 feet of an existing structure (e.g., a new garage) that result in less than less than 5,000 square feet of impervious surface so long as no stream, riparian, wetlands, ponds, or serpentine land cover type are affected. Additions are cumulative and must be calculated based on the footprint of the structure at time of Plan implementation to determine whether this threshold has been crossed.
- A covered activity on a parcel of less than 0.5 acre or less as long as no serpentine, stream, riparian, pond, or wetland land cover type is within the parcel.

A project proponent of a covered activity in the Plan will not be required to comply with the conditions in this chapter or pay any Habitat Plan fees if the proponent of the activity provides written confirmation to the Implementing Entity that the CDFG and USFWS have determined that the activity is not subject to CESA and ESA, respectively; or has already received the necessary take authorizations under CESA and ESA; or has otherwise complied with CESA and ESA. An activity will be deemed to be in compliance with CESA and ESA by the Implementing Entity and thus be exempt from the conditions in this chapter and otherwise comply with the Habitat Plan if the proponent provides the following:

1. Letters from both USFWS and CDFG that specifically refers to the activity and states that the activity is not likely to result in take of any federally or state listed species and will not preclude successful implementation of the conservation strategy for all covered species, or
2. A copy of an incidental take permit issued by CDFG for the activity, and copies of incidental take statements or incidental take permits issued by USFWS that authorize the incidental take associated with the proposed activity.

Additional covered activities are exempt from species surveys, as described in Section 6.8.5 *Item 5: Results of Applicable Species Surveys and Monitoring*, below.

Activities or projects listed in Chapter 2, Section 2.4 *Projects and Activities Not Covered by this Plan*, are specifically excluded from coverage under this Plan and therefore cannot receive take authorization, are not subject to the conditions in this chapter, and do not pay Habitat Plan fees (see Section 2.4 for additional information on these excluded activities and projects). These projects are listed below.

[5] Although private development that does not meet the criteria described in Section 2.3.2 *Urban Development* subheading *Private Development Coverage Area* and additions of less than 5,000 square feet of new impervious surface (regardless of parcel size) are not subject to the Plan, project proponents may choose to opt into the Plan. If project proponents seek to have these activities covered, the bulleted exemptions apply.

- Private sector activities that do not obtain a development, grading, building, or other construction permit involving land disturbance for the purposes of making land improvements, such as the construction of buildings, roads, and driveways ("building permits" referenced herein do not include plumbing, electrical, or mechanical permits). Activities that do not obtain these development permits are not covered by the Plan.
- SCVWD Stream Maintenance Program activities.
- City of Gilroy expansion beyond the Plan's planning limit of urban growth.
- Bay Area to Central Valley high-speed train.
- New highway between I-5 and U.S. 101.
- Routine and ongoing agricultural activities or expansion of cultivated agriculture into natural land cover types, including vineyard development, that does not seek discretionary approval or permitting by the local jurisdiction.
- Timber harvest operations.
- Quarries and other mining other than expansion of Freeman Quarry (except as otherwise noted).
- New and expanded landfills other than Kirby Canyon, Pacheco Pass Landfill expansions, and landfills occurring inside the planning limit of urban growth of the three cities.
- Mercury removal/remediation (unless described in Chapter 2 as a covered activity).
- Corps led projects.
- Pacheco dam reconstruction and reservoir enlargement.
- Pesticide/ herbicide application for the federal permit.
- Installation and operation of groundwater wells (except as otherwise noted).
- Increased development due to incorporation of San Martin.
- Dam removal and/or construction of new dams.
- Wind farm development.
- Water importation from outside the SCVWD service area.
- Emergency activities.

6.3 Conditions on All Covered Activities

The conditions below are categorized and described in several ways: by activity type, by natural community, and by species. Collectively they provide for regional and site-specific avoidance and minimization of impacts on covered species and sensitive land cover types. It is the responsibility of project

proponents to design and implement their projects in compliance with these conditions. For private projects, the applicable local jurisdictions will review project compliance with the conditions in this chapter. The Local Partners will determine best adherence to conditions where discretion exists. If a project applicant proposes to use a less preferable design option (e.g., a culvert instead of a free-span bridge), the project applicant must demonstrate why a preferred option is infeasible. For private applicants, local jurisdictions will determine if this rationale is sufficient under these circumstances.

Conditions on covered activities, including avoidance and minimization measures identified for certain covered activities and species-specific measures, may be revised over the course of the permit term based on results of implementation through the adaptive management process. Proposed revisions will be reviewed by the Wildlife Agencies upon submission of each annual report to ensure the successful implementation of the conservation strategy. Agencies will review and respond within 30 days. Revisions to conditions will be approved by the Wildlife Agencies prior to the Permittees adopting revised conditions. Allowing such revisions will ensure that out-of-date or unsuccessful management techniques do not persist and that best available science can be incorporated into the conditions as appropriate for the Plan.

Compliance with the Habitat Plan does not preclude compliance with all other applicable state and federal laws. It is the project proponent's responsibility to ensure compliance with all applicable laws and regulations.

All projects that discharge dredged or fill material into waters of the United States, including federal jurisdictional wetlands, are required to obtain applicable permits (e.g., Clean Water Act Section 404 and Section 401) from the Corps and the Regional Board. Projects that place fill, alter the bed bank or channel, or divert the flow of streams, alter portions of streams above the ordinary high water mark, alter streams that lack a nexus to navigable waters, wetlands, or lakes under the jurisdiction of the state only are required to obtain a waste discharge requirement from the Regional Board and enter into a streambed alteration agreement with CDFG[6]. Any project that requires a permit from the Corps, Regional Board, or CDFG for impacts on streams and other aquatic areas may be subject to avoidance and minimization requirements. Those requirements may differ from the avoidance and minimization requirements in this Plan.

Condition 1, described below, pertains to all covered activities. Other conditions specifically pertain to certain types of activities, certain species, or certain natural communities and are enumerated in subsequent sections.

[6] Activities covered by this Plan that need a streambed alteration agreement are expected to fully meet the standards of the streambed alteration agreement through compliance with this Plan for species covered by the Plan.

Condition 1. Avoid Direct Impacts on Legally Protected Plant and Wildlife Species

Contra Costa Goldfields

Contra Costa goldfields is a federally endangered and CNPS 1B plant species whose extreme rarity precludes coverage under the Habitat Plan. Because the Habitat Plan does not cover the species, compliance is required on an individual basis.

The likelihood of discovery of new occurrences is very low. If a new occurrence of this species is found, its avoidance would be of the highest importance to the species' viability. If an applicant encounters Contra Costa goldfields on their site, they will contact the USFWS for written concurrence of avoidance to ensure that the project does not jeopardize the continued existence of the species.

Wildlife Species Protected Under Other Laws

Several wildlife species that occur in the study area are listed as fully protected, as defined under Sections 3511 and 4700 of the California Fish and Game Code. As described in Chapter 1, CDFG cannot issue permits for take[7] of these species. Fully protected species that are known or likely to occur in the study area are listed below.

- Golden eagle.
- Bald eagle.
- American peregrine falcon.
- Southern bald eagle.
- White-tailed kite.
- California condor.
- Ring-tailed cat (= ringtail).

Three of the fully protected raptor species—white-tailed kite, peregrine falcon, and golden eagle—forage widely throughout the study area but nest in discrete locations. Bald eagles are rare winter migrants to Santa Clara County but have been known to breed in the San Francisco Bay Area. A California condor population has been established in San Benito County (Pinnacles National Monument) and birds forage occasionally in Santa Clara County. Additionally, ringtails may be found in some riparian woodlands in the study area.

Further, all migratory bird species and their nests are protected under the Migratory Bird Treaty Act (MBTA). All birds listed above and those covered by

[7] Take is defined more narrowly in the California Fish and Game Code than in the ESA; see Chapter 1, *Introduction*, for details.

the Plan (western burrowing owl, least Bell's vireo, and tricolored blackbird) are considered migratory birds and subject to the prohibitions of the MBTA. Actions conducted under the Plan must comply with the provisions of the MBTA and avoid killing or possessing covered migratory birds, their young, nests, feathers, or eggs. As described in Chapter 1, the ESA incidental take permit, once issued by USFWS, will automatically function as an MBTA Special Purpose Permit, as specified under 50 CFR Sec. 21.27, for least Bell's vireo (the only migratory bird listed as threatened or endangered under the ESA) for a 3-year term subject to renewal by the Permittees (see Appendix 5 in U.S. Fish and Wildlife Service and National Marine Fisheries Service 1996). Should any other of the covered migratory birds become listed under the ESA during the permit term, the ESA permit would also constitute a Special Purpose Permit under the MBTA for that species for a 3-year term subject to renewal by the Permittees.

Golden eagle and bald eagle are also protected under the Bald and Golden Eagle Protection Act. Take of golden eagle or bald eagle includes "impacts that result from human-caused alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment" (72 FR 31133).

6.4 Conditions on Specific Covered Activities

Conditions 2–10 pertain to seven specific categories of covered activities: urban development, in-stream capital projects, in-stream operations and maintenance, rural capital projects, rural operations and maintenance, rural residential development, and Plan implementation.

6.4.1 Urban Development

Urban development is defined as development occurring inside the urban service area of the three Local Partner cities. Although urban development is assumed in the impact analysis to occur throughout the planning limit of urban growth of each city over the 50-year Habitat Plan permit term, the density of development is not assumed to be urban unless the area is also inside of the urban service area.

There are two conditions on new urban development required by the Plan. Conditions on urban development are limited because of the generally low biological value of resources within urban areas[8]. The two general exceptions are the urban fringe and stream resources. Condition 2 below addresses the edge of new urban development in relationship to the Reserve System; in-stream activities are addressed in subsequent conditions.

[8] See Chapter 3 for the rationale for this assumption and Chapter 5 for identification of selected sites in urban areas with high-value resources.

Condition 2. Incorporate Urban-Reserve System Interface Design Requirements

For the purposes of this Plan, the urban-Reserve System interface is defined as the zone between existing and future urban development and the Reserve System. Because the study area includes three cities, development is anticipated adjacent to the Reserve System in some locations. Because of the influence of urban land uses it is anticipated that some areas generally unsuitable for covered species will border some of the Reserves. Urban buildout adjacent to reserves has the potential to directly or indirectly adversely affect covered species and natural communities within the Reserve System. Sources of such adverse effects may include vandalism, dumping of trash, trampling, unauthorized mountain bike or off-road vehicle use; runoff from adjacent streets and landscaped areas containing lawn fertilizer, pesticides, and vehicle waste (petroleum byproducts); introduction of invasive nonnative species (e.g., pampas grass, French broom, Argentine ants, giant reed); lights and noise from nearby development; unregulated movement of domestic animals; and the potential for covered species to enter developed or urban areas.

Beyond minimizing such direct and immediate impacts, the design of the urban-Reserve System interface will consider indirect and long-term effects, such as runoff from developed areas[9] that can transport harmful substances (e.g., pesticides, automotive fluids, sediment) into reserves; establishment of invasive nonnative species that can disperse from nearby landscaped areas; and structural and biological damage (e.g., soil compaction, creation of unauthorized trails, disturbance of sensitive species) that can result from unmanaged human access and use.

The interface design will address the following key questions, which are based on those proposed by Kelly and Rotenberry (1993) for urban reserves in California.

- What external forces or processes may have a negative impact on covered species and habitats at or near the reserve boundary?
- To what extent are those external forces likely to penetrate the boundary and result directly or indirectly in negative impacts on covered species and habitats? (How permeable is the boundary?)
- Which covered species are likely to exit the reserve and expose themselves to increased risk of injury or death?
- What structures can be built or programs implemented to prevent or mitigate these impacts? For example, how can boundary permeability be altered?

With these questions in mind, site-specific interface design requirements were developed to reduce negative impacts of development on covered species and to

[9] In general, development in the permit area will occur downslope from Habitat Plan reserves, so runoff should flow away from reserves. However, because construction grading often alters local drainage patterns, some runoff could flow into reserves if precautions are not taken.

help reduce conflicts if wildlife moves outside the Reserve System. The following sections (*Design Requirements*) describe requirements and opportunities for reducing impacts on covered species and natural communities on Reserve System lands adjacent to urbanized areas.

Design Requirements

New urban development that occurs adjacent to reserves or areas with moderate or high priorities for land acquisition (see Chapter 5, Section5.3.1 *Land Acquisition and Restoration Activities*) will incorporate design requirements at the urban-Reserve System interface to minimize the indirect impacts of development adjacent to existing reserves. The relevant jurisdiction (city or County) will determine which development projects are subject to this condition, as well as which components may be required for a particular development. The Implementing Entity will provide technical assistance when needed. Design requirements to be incorporated in new development at the urban-Reserve System interface, include those listed below.

- Locate the proposed development as far from the reserve boundary as possible consistent with other onsite conditions and constraints.
- Where new development occurs, roads will be placed on the interior of the development (i.e., away from the reserve boundary) to reduce the incidence of domestic pets entering the reserves and to isolate this hazard for wildlife that might enter urban areas from the reserves.
- Fences adjacent to yards or home sites will be designed to minimize the risk of pets escaping private yards and entering reserves (e.g., fences will be as tall as permitted by city and county codes, with no spaces between slats).
- Fences shared with reserve boundaries will not contain any gates between the private property and reserve to prevent entrance and trampling of sensitive species or illegal dumping (legal access to reserves will be provided at recreation staging areas).
- No private gates into the Reserve System will be allowed unless required by a pre-existing access easement and identified as an exception by the Implementing Entity.
- Public roads adjacent to reserves (e.g., a road that is aligned parallel to a reserve boundary) will be fenced to reduce unauthorized public access. Locked gates will be inspected regularly to identify any unauthorized locks.
- Development will be designed to minimize the length of the shared boundary between urban areas and the reserves (i.e., minimize the urban edge).
- Outdoor lighting will be of low intensity and will utilize full cutoff fixtures to reduce light pollution of the surrounding natural areas.
- Use of high-intensity lighting (e.g., recreation facilities, commercial parking lots) near reserves will be avoided or, if necessary, placed as low to the

ground as possible and directed away from the reserves to minimize long-distance glare.

- Public facilities such as ballparks and fields that require high-intensity night lighting (i.e., floodlights) will be sited at least 0.5 mile from the reserve boundary to minimize light pollution. Facilities may be sited closer to the Reserve System if the Implementing Entity determines that the lighting system will not be intrusive to wildlife within the Reserve System (e.g., hills block the lighting).
- For any landscaping, non-invasive plants will be required and use of native plants is highly encouraged, consistent with County landscaping guidelines (County of Santa Clara 2009).
- Natural or artificial barriers or other access restrictions may be installed around development to protect sensitive land cover types and covered species in the reserves. Barriers will be designed so they are appropriate for site conditions and resources protected. Some barriers should keep undesirable pets outside of the Reserve, other barriers should keep covered species inside the Reserve, while others should do both. Before installation of a barrier, consider if the area is used by covered species for movement, if the barrier would prevent movement critical for species life cycle, or if the barrier would encourage species to use other less favorable crossings.

Any design requirements incorporated into projects at the urban-Reserve System interface will be located within the development (i.e., not on the Reserve System) with the exception of the fuel buffer described in Condition 10 below. These features will be maintained by the property owners. The Implementing Entity will monitor compliance with these conditions along the reserve boundary concurrent with other monitoring activities described in Chapter 7. Violations will be reported to the applicable local jurisdiction for enforcement.

Although they are not under obligation or requirement, existing developments located adjacent to reserves or lands identified as land acquisition targets for Plan reserves are encouraged to adopt and implement as many of these design requirements as practicable. Local jurisdictions are encouraged to notify and involve the Implementing Entity during the design review process for large projects planned adjacent to the Reserve System.

In addition to the requirements identified above, several other requirements and avoidance and minimization measures are applicable to development near reserves. Project proponents will comply with the following conditions as appropriate.

- Condition 3. *Maintain Hydrologic Conditions.*
- Condition 7. *Rural Development Design and Construction Requirements*.
- Condition 10. *Fuel Buffer*.

Condition 3. Maintain Hydrologic Conditions and Protect Water Quality

This condition applies to all projects. The implementation of these projects could result in impacts on watershed health through changes in hydrology and water quality.

Currently, all Permittees have stormwater management plans that regulate new development and redevelopment as part of compliance with regulations under National Pollutant Discharge Elimination System (NPDES) permit requirements. An amendment to the Clean Water Act, the NPDES Program is a compliance permit regulating any point source pollution that is discharged into waters of the United States. The San Francisco Bay Regional Board administers the NPDES program in for the Coyote and Guadalupe watersheds. The Central Coast Regional Board administers the NPDES program for the Pajaro Watershed which includes Uvas, Llagas, and Pacheco subbasins. The purpose of this condition is to identify a consistent approach for applying the most important water quality conditions of each Regional Board across the study area (North and South County).

Site Design and Avoidance and Minimization Measures

Through development of stormwater management plans and complementary guidance manuals (Santa Clara Valley Urban Runoff Pollution Prevention Program 2006; City of Gilroy 2004; City of Morgan Hill 2004, 2008; Santa Clara Valley Water Resources Protection Collaborative 2006; Santa Clara Valley Water District 2008), the Permittees have identified a set of programmatic avoidance and minimization measures, performance standards, and control measures to minimize increases of peak discharge of stormwater and to reduce runoff of pollutants to protect water quality including during project construction. These avoidance and minimization measures originated, in part, from the measures that area typically required by the Regional Boards and CDFG for projects that have the potential to affect aquatic resources. Many of these avoidance and minimization measures also support the biological goals and objectives of this Habitat Plan. Implementation of these avoidance and minimization measures will reduce the potential for adverse impacts on covered species. **Table 6-2** lists avoidance and minimization measures for all water-related covered activities described in Condition 3, 4, and 5 of this Plan. Each local jurisdiction, or the Implementing Entity in the case of projects conducted by the Permittees, will verify that all appropriate measures in **Table 6-2** are implemented to minimize effects to covered species and their aquatic habitat (see Section 6.8.6). **Table 6-2** lists the source control measures and avoidance and minimization measures from the Permittees' existing stormwater management plans and complementary manuals that are most effective in protecting covered aquatic species and aquatic species habitat.

The requirements listed in **Table 6-2** include general, project design, construction, and post-construction avoidance and minimization measures. Project design measures are site design planning approaches that protect water quality by preventing and reducing the adverse impacts of stormwater pollutants and increases in peak runoff rate and volume. They include hydrologic source control measures that focus on the protection of natural resources and the reduction of impervious surfaces. Construction site conditions include source and treatment control measure to prevent pollutants from leaving the construction site and minimizing site erosion and local stream sedimentation during construction. Post-construction conditions include measures for municipal operations, stormwater treatment, and flow control.

In addition to the avoidance and minimization measures identified above, several other avoidance and minimization measures are identified in other conditions that will help reduce potential impacts to water quality in the study area. Project proponents will comply with the following conditions as appropriate.

- Condition 2. *Incorporate Urban Reserve System Interface Design Requirements*.
- Condition 4. *Stream Avoidance and Minimization for In-Stream Projects*.
- Condition 5. *Avoidance and Minimization Measures for In-Stream Operations and Maintenance*.
- Condition 7. *Rural Development Design and Construction Requirements.*
- Condition 8. *Implement Avoidance and Minimization Measures for Rural Road Operations and Maintenance.*
- Condition 11. *Stream and Riparian Setbacks*.
- Condition 12. *Wetland and Pond Avoidance and Minimization*.

6.4.2 In-Stream Projects

In-stream projects—such as flood protection projects, construction of new bridges and repair or rehabilitation of existing bridges or culverts, and water supply capital projects—have the capacity to affect wildlife, aquatic species, and habitats by introducing sediment discharge, disturbing earth and riparian vegetation, and altering hydrologic and hydraulic characteristics of water bodies. Condition 4 is designed to address such impacts.

Several of the in-stream covered activities described in Chapter 2 are also covered activities under the SCVWD proposed Three Creeks HCP. The conditions described below for in-stream projects, as well as for stream and riparian habitat and associated covered species (e.g., Condition 16), are consistent with the Three Creeks HCP.

Condition 4. Avoidance and Minimization for In-Stream Projects

The primary purpose of this condition is to identify design requirements and construction practices for in-stream projects to minimize impacts on riparian and aquatic habitat. The term *in-stream* is defined for the purposes of this Plan as the stream bed and bank and the adjacent riparian corridor. The adjacent riparian corridor encompasses all mapped riparian land cover (i.e., riparian forest and scrub natural community) immediately adjacent to a stream (see **Figure 3-10** for mapped land cover types). All in-stream projects must be designed to minimize adverse impacts on stream morphology, aquatic and riparian habitat, and flow conditions. Projects that may also affect wetlands or pond areas are addressed in Condition 12, *Wetland and Pond Avoidance and Minimization*.

All in-stream projects, including projects occurring in dewatered reservoirs, will adopt design requirement and construction avoidance and minimization measures to minimize impacts on covered species, natural communities, and wildlife movement. SCVWD and other Local Partners, such as County Parks, have developed avoidance and minimization measures for projects occurring in streams. The Fishery Network of Central California Coastal Counties (called "FishNet 4C" for the original four counties involved) developed the *County Road Maintenance Guidelines for Protecting Aquatic Habitat and Salmon Fisheries* (Fishery Network of Central California Coastal Counties 2004). This manual, while focused on road maintenance activities, provides avoidance and minimization measures that are applicable to all types of in-stream construction activities. **Table 6-2** summarizes these collected avoidance and minimization measures that are required conditions of in-stream covered activities. Avoidance and minimization measures in this table are applicable to the covered activities addressed in this condition as well as in Condition 3, *Maintain Hydrologic Conditions and Protect Water Quality* and Condition 5, *Avoidance and Minimization Measures for In-Stream Operations and Maintenance*. The avoidance and minimization measures address construction staging, dewatering, sediment management, vegetation management, bank protection, drainage, trail construction, and ground disturbance.

All avoidance and minimization measures listed in **Table 6-2** are required unless the avoidance and minimization measure is not appropriate for the activity or field data collected at the site or in comparable areas demonstrate that the avoidance and minimization measure would not benefit wildlife or reduce impacts on natural communities. The Implementing Entity will update the avoidance and minimization measures in **Table 6-2** over time so that they are more appropriate for implementing a specific covered activity or more beneficial for the covered species. Therefore, the Implementing Entity will update this list of avoidance and minimization measures over the permit term as appropriate to reflect new science and avoidance and minimization measure monitoring results. Proposed revisions will be reviewed by the Wildlife Agencies upon submission of each annual report to ensure the successful implementation of the conservation strategy. **Table 6-2** also includes additional avoidance and minimization measures drawn from those currently used by the Local Partners that strive to

reflect current and forthcoming regulations and guidelines for in-stream project design (e.g., the State Water Board's *Wetland and Riparian Area Protection Policy*, described below).

Types of Projects Subject to Condition

The in-stream projects listed below are subject to the design requirements or construction practices because they are expected to result in impacts on creeks or streams.

- Installation or rehabilitation of flood protection projects and levee reconstruction.
- Bank stabilization projects.
- Geomorphic rehabilitation.
- Gravel enhancement.
- Bridge construction and replacement including vehicular, train, and pedestrian bridges throughout the study area.
- Development of trails in or through the in-stream area (stream bed, banks, and adjacent riparian land cover).
- Culvert installation or replacement.
- Dam repair and seismic retrofit, including dewatering events and development of borrow sites.
- Restoration projects throughout the study area, including creek realignment and erosion management.
- Operation, maintenance and replacement of existing water supply structures such as stream gauges, percolation ponds, and diversions.
- Any other activity that requires construction work within the in-stream area (stream bed, banks, and adjacent riparian land cover).

Design Requirements

Some impacts on stream and riparian land cover types are expected under the Plan (see **Tables 4-2 and 4-3**). All covered activities subject to this condition will implement the measures listed in **Table 6-2** associated with this condition to avoid or minimize impacts of covered activities on streams and riparian woodland/scrub.

- Applicants must also comply with Condition 7 *Rural Development Design and Construction Requirements* where applicable.
- Applicants for projects with streams on site must follow the setback requirements in Condition 11, *Stream and Riparian Setbacks*.

- Applicants for projects with wetlands or ponds on site must comply with Condition 12, *Wetland and Pond Avoidance and Minimization*.
- Applicants for transportation improvements that include stream crossings must comply with Condition 6, *Design Requirements for Covered Transportation Projects*.

Design Criteria for SCVWD Flood Protection Projects

Flood protection projects shall be designed with an objective to protect or enhance natural channel and habitat functions. Designs will be developed and selected to maintain or improve bank stability, minimize bed degradation or aggradation, protect or improve streambed substrate conditions, protect or increase habitat diversity and complexity, and minimize required maintenance. All covered flood control projects will incorporate the following design elements:

1. Flood protection projects will incorporate support for natural stream functions and allow for natural stream processes to occur consistent with the flood protection goals of the project. Approaches for flood protection will generally include excavation of flood benches based on natural geomorphic conditions, off-stream detention, set-back levees or floodwalls, biotechnical bank stabilization methods, and grade control.
2. Project design alternatives will consider habitat connectivity between the stream and the adjacent floodplain as an objective.
3. Project design alternatives will incorporate native riparian vegetation and in-stream habitat enhancement features, where feasible. Potential enhancement features will be evaluated during the project design review process described below.
4. Bypasses that convey all or a portion of flood flows into channels, tunnels, culverts, or other areas that are isolated from the natural stream will be used only when other options have been evaluated and found infeasible to meet flood protection goals. If used, bypasses will be designed considering local geomorphic and flood characteristics and will minimize impacts to in-stream habitat.

Review Process for Covered Flood Control and Levee Reconstruction Projects

1. Flood control and levee reconstruction projects shall be reviewed by the Wildlife Agencies as described in Chapter 8, Section 8.7.3 *Wildlife Agency Responsibilities*.
2. During the 60% project design stage(s), review and input from the Wildlife Agencies shall be solicited.
3. The Wildlife Agencies providing review will return comments within a mutually agreeable timeline to maintain project schedule. As described in Chapter 8, Section 8.7.3 *Wildlife Agency Responsibilities*, the Wildlife Agencies must review and approve flood control projects to ensure that they are consistent with Habitat Plan requirements.

Requirements for SCVWD Dewatering Events

The following conditions apply to the dewatering events conducted at SCVWD covered reservoirs. Dewatering events *are necessary* for seismic safety retrofit and major maintenance (see Chapter 2 for a description of these covered activities). Due to the unique characteristics at each dam site, a reservoir-specific dewatering plan will be submitted to the Wildlife Agencies for review and approval prior to the first dewatering event for each reservoir (see Chapter 8, Section 8.7.3 *Wildlife Agency Responsibilities* for details of this process). Dewatering plans will be reviewed and, if appropriate, updated prior to subsequent dewatering events during the permit term. Dewatering plans will address various issues as requested by the Wildlife Agencies during the covered activity review process or as required by the environmental compliance process and will include the following.

- Timing for the initiation and duration of the dewatering event, including the draining and refilling stages of the dewatering event.
- Average, minimum, and maximum flows expected during draining and refilling (flows will be within the limits described in **Table 2-4**) including the duration of periods in which the maximum reservoir release may be made.
- A schedule for re-operation according to applicable rules curves.
- The ability of SCVWD to bypass water or provide other supplemental sources downstream.
- Documentation of in-channel dryback conditions from the previous 3 years, if feasible, and an evaluation of potential increases in the length and duration of dryback related to the dewatering event.
- A qualitative assessment of total flows that could occur downstream of the dam when taking into account stream inflows other than reservoir releases (e.g., stormwater, urban runoff) based on monitoring done during the previous years to assess the level of potential dryback.
- A description of baseline monitoring conducted for California red-legged frog, foothill yellow-legged frog, and western pond turtle in channels to be affected by the drawdown to establish presence of covered species in the channel.
- A description of anticipated effects of the dewatering event on covered species.

In addition, minimization measures included in a dewatering plan could include, but are not limited to, the following.

- Releases will not result in the overtopping of the channel between May and July when western pond turtles are nesting.
- SCVWD will bypass reservoir inflow around the dam and/or provide other supplemental flows downstream of the reservoir.
- SCVWD will consider installing outlets that provide better control over release volumes (beneficial for subsequent dewaterings).

- SCVWD will ramp increases and decreases in flows during dewatering to avoid washing covered species downstream or drying back the channel faster than covered species can adapt and move to new locations.
- Surveys for covered species as required by this chapter prior to re-filling of the reservoir or other construction activities if the reservoir basin has been undisturbed for a period of time. Surveys may be limited to areas that were not disturbed during construction or that were not inundated before construction but may be after construction.
- As reservoir levels decline, the gravel trap at the upstream end of the reservoir, if present, will be isolated and lined to contain inflow to provide for a relocation site for rescued native fish, amphibians, and/or western pond turtle.
- The lined gravel traps will be designed to allow bypass of inflow through or around the reservoir.

6.4.3 In-Stream Operations and Maintenance

In-stream[10] operations and maintenance activities covered under this Plan—such as sediment removal, bank stabilization, vegetation management, and debris blockage removal to maintain flows—have the potential to affect covered species by introducing sediment and other pollutants into downstream waterways or by disturbing riparian land cover associated with streams. Condition 5 specifies avoidance and minimization measures for covered operations and maintenance activities within and immediately adjacent to the stream channel. Note that SCVWD's Stream Maintenance Program is not a covered activity under this Plan and therefore not subject to the conditions of this chapter of the Plan.

Condition 5. Avoidance and Minimization Measures for In-Stream Operations and Maintenance

The purpose of this condition is to identify avoidance and minimization measures to be applied when conducting in-stream operations and maintenance activities. The measures will help reduce impacts on stream and riparian land cover types and covered species.

Types of Projects Subject to Condition

The following in-stream operations and maintenance activities are subject to the measures or construction practices described below because they are expected to result in impacts on creeks or streams.

[10] *In-stream* is defined for the purposes of the Plan as, "the stream bed and bank and the adjacent riparian corridor."

- Facility maintenance such as trail, bridge, road, and culvert repair and/or replacement in in-stream areas.
- Natural resource protection such as small bank stabilization projects and removal of debris deposited during flooding.
- Operations and maintenance of flood protection facilities (e.g., dams, armored creeks, detention ponds, streams). Activities may include vegetation management, minor sediment removal, or bank stabilization.
- Operations and maintenance of water supply facilities (e.g., flashboard dams, inflatable dams, stream gages, pipelines, and diversions).
- Non-routine stream maintenance activities conducted by SCVWD (i.e., those activities not covered by SCVWD's Stream Maintenance Program) including extensive removal of vegetation in the Lower Llagas flood control channel.
- Removal of debris blockages except in emergency situations.
- Mitigation and/or monitoring in creeks or adjacent riparian corridors.
- Vegetation management for exotic species removal, such as removal of giant reed, and native vegetation plantings.
- Reservoir dewatering events.
- Reservoir filling.

Avoidance and minimization measures listed in **Table 6-2** will apply to all streams in the project areas as well as to open canals, because these canals may provide habitat for covered species.

Stream Operation and Maintenance Activities

Several of SCVWD's Stream Maintenance Program avoidance and minimization measures were adapted for inclusion in **Table 6-2** and will be adopted for this Plan. Additional avoidance and minimization measures are identified below to ensure adequate avoidance and minimization of species covered under this Plan during implementation of stream operations and maintenance covered activities. These avoidance and minimization measures were informed by sources that include the Santa Clara Valley Resources Protection Collaborative *Guidelines and Standards* (Santa Clara Valley Water Resources Protection Collaborative 2006) and the SCVWD *Best Management Practices Handbook* (Santa Clara Valley Water District 2008). Throughout the permit term, avoidance and minimization measures listed in **Table 6-2** will be updated through the adaptive management process to reflect current best practices.

Dam Maintenance Program

All applicable measures in **Table 6-2** will apply to implementation of activities associated with the Dam Maintenance Program (see Chapter 2). In addition,

activities requiring reservoir dewatering will comply with the requirements for dewatering reservoirs described above under Condition 4 *Stream Avoidance and Minimization for In-Stream Projects* and in Chapter 2.

Pipeline Maintenance Program

While SCVWD's Pipeline Maintenance Program is described in Chapter 2 under Section 2.3.6 *Rural Operations and Maintenance*, some activities have the potential to affect aquatic resources, particularly at blow-off sites. The following avoidance and minimization measures are from SCVWD's Pipeline Maintenance Program Final Program EIR (MHA Environmental Consulting 2007) and will be applied to Pipeline Maintenance Program covered activities in addition to other applicable avoidance measures described in this chapter.

- The discharge location and receiving water will be observed for signs of erosion by a trained individual. If erosion is evident, flow rates will be reduced. If erosion continues to occur, discharges will be terminated until appropriate erosion control measures are installed. Monitoring will be conducted just prior to the start of the discharge and regularly (i.e., every hour, every four hours, every eight hours) during the discharge. Monitoring frequency will depend on the nature of the discharge and the erosion in the area.
- An environmental monitor will walk along each discharge drainage to the termination of the drainage or 500 feet downstream to inspect for erosion after a draining is complete. If erosion is detected, reclamation measures will be taken to correct the erosion. Correction measures shall include recontouring the land to its previous state and revegetating with the appropriate native grass species in the area, if necessary.
- Discharge rates will be ramped up slowly such that the increase in flow rate in the receiving water is gradual and scouring of the channel bed and banks does not occur.
- Flows will be diverted around sensitive, actively eroding, or extremely steep areas to prevent erosion. Flow diversion methods might include use of flexible piping and/or placement of sandbags to alter flow direction, or equivalent measures. The new flow path and discharge point will be monitored for signs of erosion.
- Pipeline discharge for maintenance work would preferentially be performed during winter months, when storm events are more common and when water is naturally highest. Discharge flows are then a minimal portion of overall stream or river flow. If draining must occur during summer or fall, a slow release is mandatory to ensure receiving waters do not experience a substantial temperature change (greater than 2 degrees Fahrenheit).

6.4.4 Rural Projects

Rural projects include transportation projects, the South County Airport expansion, the Kirby Landfill expansion, construction of large new recreation facilities (e.g., golf course, sports fields, and extensive picnic areas), capital water supply projects, and private rural residential and commercial development. These rural projects have the potential to affect covered species by removing substantial areas of habitat, disrupting hydrologic patterns, contributing to habitat fragmentation, discharging sediment into water bodies, and resulting in direct mortality of covered species. Conditions 6 and 7 are designed to reduce the severity of such impacts for rural projects.

Condition 6. Design and Construction Requirements for Covered Transportation Projects

This condition identifies design requirements to minimize the impacts of transportation projects on wildlife movement, occurrences of certain covered species, and important habitat for covered species. All road and rail transportation projects (including the BART extension), or portions thereof, outside streams and within the planning limit of urban growth are exempt from this condition. Road projects in these areas are either within participating cities (i.e., urban areas) or within adjacent County jurisdiction, both of which support relatively dense suburban development. Road projects in these areas are not expected to significantly affect wildlife linkages, occurrences of covered species, or habitat for covered species. All covered transportation projects that cross streams or creeks, including bridges, are subject to Condition 4 above.

Four new road extensions/connections/realignments are proposed outside the planning limit of urban growth during the permit term of this Plan. However, many road improvements, including road widenings, are covered by the Plan (see **Table 2-6**). One new mass transit project is covered by the Plan: the double tracking of the Caltrain line from San José to Gilroy along the existing corridor.

Exempt Transportation Projects

The following projects are not subject to the design requirements or construction practices specified in this condition because they are not expected to result in new ground disturbance and are not expected to create new wildlife movement barriers or augment existing barriers.

- Installing traffic signals, signs, pavement markings, flashing beacons, or other safety warnings.
- Painting new lane striping.
- Installing “rumble” strips, channelizers, or other safety markers.
- Installing guardrails or similar structures that are permeable to wildlife.

- Installing ramp metering.
- Regrading existing shoulders (this activity is considered maintenance; see Condition 8).
- Implementing other road safety improvements on less than 1,000 feet of roadway.

All transportation projects that cross creeks are subject to Condition 4 above.

The following projects are also exempt from this condition, due to their small footprint, if the project does not include installation of median barriers or other impermeable safety barriers, and if no mapped or unmapped stream, riparian, serpentine, pond, or wetland land cover types are present, and if the activity is not located in a stream setback. Project lengths must be calculated based on the all new adjacent projects constructed since the time of Plan implementation to determine whether the below thresholds have been crossed.

- Widening roads to add lanes where the project is less than or equal to 1,000 feet in length.
- Realigning roads for safety or operational purposes where the project is less than or equal to 1,000 feet in length.
- Constructing new turn lanes less than or equal to 1,000 feet in length.
- Constructing a new road shoulder less than or equal to 1,000 feet in length.

Outside the planning limit of urban growth transportation projects will adopt design requirements and construction practices to minimize impacts on covered species, natural communities, and wildlife movement (see below). Depending on the type of project, these design requirements and construction practices would be *required* or *possible* (**Table 6-3**).

- **Required** (R). Design element or construction practice is required.
- **Possible** (P). Design element or construction practice is required unless field data collected at the site or in comparable areas demonstrate that the element or practice would not benefit wildlife, and CDFG and USFWS concur with the findings.

Types of Projects Subject to Condition

The following projects are subject to the design requirements or construction practices because they are expected to result in new ground disturbance, or they may create new wildlife movement barriers or augment existing barriers. Each project category is subject to a specific combination of requirements listed below and in **Table 6-3**.

Highway Projects

Highway projects are those VTA projects identified in **Table 2-6** as highway projects that call for the expansion of existing highways within the study area.

Mass Transit Projects

The single mass transit project identified for coverage in this Plan is the VTA project identified in **Table 2-6** as *Caltrain South County* which calls for the double tracking of the existing Caltrain corridor.

Roadway Projects and Interchange Upgrades

Major roadway projects and interchange upgrade projects (major roadway projects) are those projects identified in **Table 2-6**. All non-exempt Santa Clara County roadway projects and VTA interchange upgrades identified in **Table 2-6** are subject to the conditions identified **Table 6-3**.

Road Safety and Operational Improvements

These projects include the road projects described in Section 2.3.5 *Rural Capital Projects* that are not listed in **Table 2-6**. Road safety and operational improvements are expected to involve ground-disturbing activities but are not expected to impede or substantially worsen wildlife linkage. However, there may be opportunities for some projects to improve wildlife linkages. These projects are subject to construction and post-construction practices but not to project design requirements (**Table 6-3**).

Dirt Road Construction

Dirt roads may be constructed by the Permittees or private landowners to access their property. These projects are subject to construction and post-construction practices but not to project design requirements (**Table 6-3**).

Pre-Design Data Collection for Wildlife Movement

For transportation projects with the greatest potential to affect wildlife movement (see **Table 6-3** and lists above), it will be important to incorporate requirements that minimize the projects' adverse impacts on wildlife movement. In some cases, transportation projects may present opportunities to upgrade existing structures to improve wildlife movement. For these upgrades to be most effective, they will be supported by data describing movement of wildlife at or near the project site and the likelihood of vehicle collisions based on traffic patterns.

To facilitate better project design and to avoid delays in project construction due to the data collection process, the Implementing Entity will establish a long-term data collection program on wildlife movement in the study area. The primary goal of this program will be to determine the movement patterns of key covered species and other native wildlife throughout the study area. Data collection stations will be established at points along covered transportation projects that are most likely to affect wildlife movement. Wildlife movement will be studied at key sites to determine which species move through the area, when they move and, most importantly, which landscape features are most often used. Techniques used for data collection will vary by site and target species but may include remote cameras, wildlife track pads, and roadkill observations. This program is described in greater detail in Chapter 5. It is expected that several

years (or decades) of data will be available to inform project design by the time that many of these projects reach the design stage. (This monitoring program is in addition to the wildlife corridor feasibility study discussed in Chapter 5.)

Data collection will be required on wildlife movement along the applicable project corridor for at least 1 year prior to project design. These data will be used to select the design requirements most appropriate for the species and conditions particular to the site (see below). If the Implementing Entity has not collected data in the project vicinity and the project timeline does not permit new data collection, then the applicant must apply all the design guidelines on the basis of the best available information for the region and appropriate to the conditions at the project site.

Transportation project applicants will coordinate with the Implementing Entity and Wildlife Agencies on applicable projects as indicated in **Table 6-3** during the conceptual design phase to ensure that as the project moves from conceptual to final design, the project meets the terms of this Plan.

When multiple road expansions are planned for a roadway during the permit term, wildlife crossing needs will be considered for each roadway as a whole, not by road segment. Further, design requirements will be considered for each wildlife species likely to cross the facility (Barnum 2003). These data will inform the design of wildlife movement structures suitable for the site and the species that use the area. In addition, after each project component is installed, wildlife activity along the road will be monitored to assess how wildlife responded to the project, if behavior has changed, and if additional design considerations will be utilized as future projects are implemented along the roadway.

Transportation Project Design Requirements

To reduce the impacts of construction activities on natural communities and native species within the study area, the design requirements listed below will be implemented for applicable transportation projects (**Table 6-3**). Design requirements are based on the latest techniques for minimizing impacts of transportation projects (Forman et al. 2002; Irwin et al. 2003; Finch 2004; Hilty et al. 2006). Some design requirements may be updated by the Implementing Entity if the best available science indicates that such updates would be more effective at facilitating safe wildlife movement across transportation corridors. Because the effectiveness of road crossings designed for wildlife is an active area of research, frequent advances in design are expected throughout the permit term.

- **Enhance existing undercrossings.** When road expansion projects span an undercrossing, such as a culvert, existing undercrossing structures will be enhanced within safety or engineering limitations to allow for fish and wildlife movement. Existing culverts or other potential crossing points will be enhanced if results of data collection indicate that the existing structure is inadequate. The design requirements of replacement structures will be

determined by the species that have been documented using or attempting to use the site. Wildlife crossings that can serve multiple species will be used whenever possible.

- **Crossing enhancements.** Crossing enhancements must incorporate design requirements identified for culverts in Condition 4, *Stream Avoidance and Minimization for In-Stream Projects*.
- **Minimum sizing of culverts.** Culverts must be the minimum length, height, and width necessary to provide safe passage under the road for the target species present at the site (based on data collected as described above). Culvert designs will be based on the best available data at the time. Current recommendations are that culverts designed for medium-size mammals (e.g., San Joaquin kit fox, coyote, raccoon) be 5–8 feet in diameter (although culverts larger than 8 feet in diameter may be needed for longer crossings). Culverts designed for small mammals or amphibians are recommended at 18–48 inches in diameter. Culverts will provide a natural substrate on which wildlife can travel (e.g., open bottom box culvert) when such designs are compatible with the hydrologic needs of the culvert.
- **Install grating to allow ambient light to penetrate undercrossing.** Culverts will include grating on the inactive part of the roadbed (e.g., road shoulders or median) to allow filtration of ambient light and moisture but minimize noise intrusion. Artificial lighting inside tunnels or culverts will not be used; these devices have not been shown to be effective and may deter nocturnal wildlife. Such devices may also be vandalized.
- **Fencing design.** Fencing will be required in areas where high mortality rates of species attempting to cross the road occur. Fencing will be used along the perimeter of the roadway to direct animals to undercrossings and minimize their access to the road. Fencing designs will be tailored to the species expected to use the undercrossing and will be based on the best available data on species use and best fencing designs available at the time. For example, fencing for amphibians will be high enough to prevent amphibian crossing but low enough to allow movement of other species (e.g., deer, badgers, etc.). Fencing will extend out from the undercrossing along the road to an appropriate distance that will serve as a barrier to wildlife attempting to cross the road. The distance that fencing extends from the undercrossing will be determined on a case-by-case basis and will consider locations of known collisions in the area. Right-of-way fencing could be designed to serve this purpose. Fencing must be attached to the undercrossing to prevent wildlife from passing through a gap between the undercrossing and the beginning of the fence.

  Fencing must be monitored regularly by the facility owner and repairs made promptly to ensure effectiveness. Vegetation must be managed along small mammal and amphibian fencing to reduce the opportunity for these species to climb the fence. Fencing designed for small mammal or amphibian exclusion must be installed at least 8 inches into the soil to prevent small mammals from tunneling under the fence.

Where low-traffic side roads (e.g., ranch roads) cross the wildlife fences along the main roadway, gates will be used whenever possible to avoid creating a gap in the fence that wildlife could move through. The gate will be designed to minimize the gap between the gate and the roadbed. If gates are not feasible, an in-roadway barrier (e.g., wildlife grates) or device that channels species away must be installed to deter wildlife from moving around fences and into the road.

- **Passage placement.** New passages will only be placed or located in areas that connect two viable habitats so that wildlife is not directed into urbanized areas.
- **Road or rail barrier designs.** When compatible with vehicle and train safety, road and rail median barriers or shoulder barriers will allow wildlife to cross under or over the barrier in the event they become trapped in the right-of-way. For example, one-way gates could be used to allow movement out of the hazardous zone but not into it.

Construction Practices

The following construction practices apply to categories of transportation projects listed in **Table 6-3**.

Avoidance and Minimization Measures for Transportation Projects

- Minimize ground disturbance to the smallest area feasible.
- For construction of new dirt roads, prevent rills (a narrow groove or crack in the road resulting from erosion by overland flow) by breaking large or long bare areas up into smaller patches that can be effectively drained before rills can develop (Fishery Network of Central California Coastal Counties 2004).
- For construction of new dirt roads, disconnect and disperse runoff flow paths, including roadside ditches, which might otherwise deliver fine sediment to stream channels (Fishery Network of Central California Coastal Counties 2004).
- For construction of new dirt roads, prevent gullies by dispersing runoff from road surfaces, ditches and construction sites, by correctly designing, installing and maintaining drainage structures (e.g., road shape, rolling dips, out-sloped roads, culverts, etc.) and by keeping streams in their natural channels. No single point of discharge from a road or other disturbed area should carry sufficient flow to create gullies. If gullies continue to develop, additional drainage structures are needed to further disperse the runoff (Fishery Network of Central California Coastal Counties 2004).
- When constructing or reconstructing a ditch, utilize designs for outlet locations that avoid directly dumping ditch water into surface waters, when practical. If not practical, implement sediment management avoidance and minimization measures to trap sediment before it reaches a stream. Avoidance and minimization measures described in Condition 3 and

Condition 4 will be applied as appropriate (Fishery Network of Central California Coastal Counties 2004).

- When designing or redesigning roads, look for opportunities to restore natural drainage patterns. Install culverts or rolling dips to retain water in its drainage of origin, which will decrease the potential for erosion downstream. On problem roads, look for opportunities to reconstruct the road segment to improve and maintain natural drainage patterns; for example, add rolling dips, emergency water bars and additional cross drains (Fishery Network of Central California Coastal Counties 2004).
- When constructing dirt roads, install road surface and ditch drainage structures frequently enough so that gullies do not form at drainage points and so that the road and drainage system are generally dry (Fishery Network of Central California Coastal Counties 2004).
- Equipment storage, fueling, and staging areas will be sited on disturbed areas or on non-sensitive nonnative grassland land cover types, when these sites are available, to minimize risk of direct discharge into riparian areas or other sensitive land cover types. When such sites are not available, staging will occur on the road used to access the site.
- All species survey requirements of this Plan will be followed within the construction zone (i.e., the limit of project construction plus equipment staging areas and access roads) and the entire road right-of-way. Expanding the survey area beyond the project footprint will help identify covered species and their habitats so that impacts on covered species that occur adjacent to the construction zone can be minimized.
- No erodible materials will be deposited into watercourses. Brush, loose soils, or other debris material will not be stockpiled within stream channels or on adjacent banks.
- Silt fencing or other sediment trapping methods will be installed below the grade of new road construction or road widening activities to minimize the transport of sediment off site.
- Temporary barriers will be constructed to keep wildlife out of construction sites, as appropriate.
- Onsite monitoring will be conducted by a qualified biologist throughout the construction period to ensure that disturbance limits, avoidance and minimization measures, and Plan restrictions are being implemented properly.
- Use existing roads for access and disturbed area for staging as site constraints allow. Off-road travel will avoid sensitive communities such as wetlands and known occurrences of covered plants.
- Active construction areas will be watered regularly to minimize the impact of dust on adjacent vegetation and wildlife habitats, if warranted.
- Portions of the project that occur in streams (e.g., bridge or culvert construction) will comply with Condition 4.

Post-construction Practices

Following construction, the areas beyond road shoulders and inside the right-of-way will be returned to a pre-project or ecologically improved condition. These actions will likely be applied differently to each road project and will decrease the potential for the spread of nonnative species.

- Invasive plants within the project area and any construction staging areas will be removed to prevent the spread of these species into nearby or adjacent reserves.
- All disturbed soils will be revegetated with native plants and/or grasses or sterile nonnative species suitable for the altered soil conditions upon completion of construction. Local watershed native plants will be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives. All disturbed areas that have been compacted shall be de-compacted prior to planting or seeding.
- Vegetation and debris will be managed in and near culverts and under and near bridges to ensure that entryways remain open and visible to wildlife and that the passage through the culvert or under the bridge remains clear.

All structures constructed for wildlife movement (tunnels, culverts, underpasses, fences) will be monitored at regular intervals by the Local Partner facility owner and repairs made promptly to ensure that the structure is in proper condition. For facilities owned by entities not participating in the Habitat Plan (e.g., California Department of Transportation [Caltrans]), the Implementing Entity will secure access and data collection agreements with these entities to allow the Implementing Entity to conduct this monitoring.

Condition 7. Rural Development Design and Construction Requirements

For this Plan, rural development is defined as any new development that occurs outside of the urban service area at the time the development is permitted under the Plan, or those areas within the urban service area that are only covered for development consistent with rural land uses. The rural development covered activities listed below are subject to this condition and to the applicable permitting process of the local jurisdiction.

- Residential development (e.g., single family homes, subdivisions) consistent with the County General Plan (County of Santa Clara 1994). Ancillary improvements may include privately owned bridges, driveways, access roads, vineyards or orchards, and other accessory structures associated with rural dwelling units.
- Non-residential development consistent with the County General Plan (County of Santa Clara 1994). This includes new commercial facilities

(institutional, industrial) agricultural facilities (mushroom farms, commercial stables, and equestrian event facilities) or similar uses that obtain building, grading and/or other development permits, consistent with local general plans, such.

- Vineyard, orchard, or other farming activity that obtains a building, grading, or development permit from the County or City.
- Residential or non-residential development on the non-urban hillsides of eastern San José (outside the planning limit of urban growth) and in the Coyote Valley Urban Reserve and South Almaden Valley Urban Reserve consistent with the San José General Plan.
- Residential or non-residential development in the Morgan Hill Southeast Quadrant consistent with the Morgan Hill General Plan.
- Residential or non-residential development in the Hecker Pass Specific Plan area consistent with the Gilroy General Plan.
- Projects, including capital projects, implemented by Permittees outside the urban service area.

As described in Chapter 4, rural development in hillside and natural areas that will remain rural has a greater potential for direct and indirect impacts on sensitive habitat and more covered species than urban development in already developed areas for a number of reasons. First, rural development tends to occur on larger parcels or in less constrained sites, affecting larger areas. Second, the existing landscape in hillside and natural areas is generally less disturbed prior to project construction on rural development sites than on urban sites. Third, rural development tends to occur near or in areas with native vegetation and higher biological values, including areas near or adjacent to the Reserve System. Rural development in natural areas tends to increase habitat fragmentation, which degrades or disrupts landscape connectivity. New driveways and roads associated with rural development may create new hazards or barriers to species dispersal. Indirect impacts also occur at both the development site and the landscape level, as rural development can introduce new sources of noise, light and glare, air pollution, and vehicle traffic in more remote areas. Despite the potential for these adverse effects on natural communities and covered species, rural development projects often have greater flexibility to modify designs to reduce or minimize impacts on covered species and natural communities than projects in urban areas.

As described in Chapter 4, existing land use restrictions and requirements also substantially limit the footprint and extent of rural development. For example, almost all of the areas intended to be incorporated into the Reserve System (see Chapter 5) are large land holdings designated as Hillside or Ranchland land uses under the County General Plan. In these areas, the maximum development density allowed is one residence per 20 to 160 acres, based on the average slope of a parcel. Subdivision of sites designated Hillside or Ranchland seldom occurs and this pattern is not expected to change during the permit term due to the physical challenges of development in most of the study area. Under County policies, most subdivision proposals for Hillside parcels are required to cluster

future development and preserve a minimum of 90% of the site as open space. If suitable, these large set-asides could be incorporated into the Reserve System. County policies and regulations also require that grading be minimized in Hillside and Ranchland areas through the site design process, which emphasizes compact development. These land-use restrictions help to minimize the effects of rural development on covered species and natural communities.

The primary goal of this condition is to minimize the potential direct and indirect impacts of rural development in areas that will remain primarily rural on covered species and natural communities most likely to be affected by rural development (see Chapter 4, including **Table 4-1**, for an accounting of which species could be affected by rural development). Additional goals of this condition are listed below.

- Minimize habitat fragmentation and degradation of landscape linkages (e.g., wildlife corridors), including maintaining connectivity between aquatic, riparian, and upland habitats.
- Minimize loss of sensitive land cover types and natural communities including but not limited to riparian woodlands, seasonal wetlands, freshwater marsh, ponds, serpentine grassland, valley oak woodland, knobcone pine woodland, and ponderosa pine woodland.
- Reduce the extent of new roads in remote rural areas in order to reduce negative impacts on species.
- Minimize degradation of streams and maintain the hydrograph to the baseline (defined as the existing conditions at the time of Plan approval), or adjust the hydrograph toward predevelopment conditions[11].
- Minimize construction-related impacts, including noise; air emissions; erosion and sedimentation; disturbance of native vegetation; and introduction of nonnative, invasive species.
- When designing or retrofitting County facilities, evaluate whether the project can be designed to reduce impervious surfaces to less than pre-project conditions.

This condition integrates existing County requirements with additional avoidance and minimization measures that are intended to reinforce current regulations and support the goals of this condition. The design requirements and conditions for all rural development covered by the Plan are listed below and will be applied as applicable.

Design and Construction Requirements

Projects subject to this condition are required to follow the following measures.

[11] The hydrograph will be monitored using existing stream gages within the study area, new gages proposed under the plan, and could be monitored at large developments occurring during the Permit Term, as deemed appropriate by the Implementing Entity.

- Plans presented to local jurisdiction planning staff by private applicants for discretionary approval or a building permit process must identify the proposed impact area and general location of site design features (e.g., residence, access road, leach field, wells, vineyards, accessory structures, etc.). The site plan will show all improvements that will result in permanent land cover impacts (e.g., home, driveway, barn, pool, patio, landscaping, and utilities, etc.), including a 50-foot buffer around all proposed site improvements. The project area plus the 50-foot buffer is called the *development area*. This site plan will also show all site improvements that will result in temporary land cover impacts during construction but that will be returned to the pre-project land cover type within 1 year of completing construction (e.g., leach fields, well pipelines that do not result in permanent habitat disturbance), including a 10-foot buffer around the proposed footprint of the site improvements. Plans do not need to show buffer areas (50 feet for permanent improvements and 10 feet for temporary improvements) that cross property boundaries (e.g., a house 30 feet from a property line only needs to show the buffer area up to the property line). **Figure 6-1** provides an example map of the information required on the site plan. (**Figure 6-1** also defines the development area for the purposes of determining survey areas [see Section 6.8.5 *Item 5: Results of Applicable Species Surveys and Monitoring*] and calculating development fees [see Chapter 9, Section 9.4.1 *Habitat Plan Fees*]).
- Minimize ground disturbance to the smallest area feasible.
- Build close to, and utilize to the extent practicable, existing infrastructure (e.g., existing driveways, utility lines).
- Use existing roads for access and disturbed areas for staging as site constraints allow. Off-road travel will avoid sensitive communities such as wetlands and known occurrences of covered plants.
- Adhere to Condition 10, *Fuel Buffer*.

Site Hydrology

- Develop only the minimum number of stream crossings necessary to access the property.
- At project sites that are adjacent to any drainage, natural or manmade, exposed soils must be stabilized or otherwise contained on site to prevent excessive sediment from entering a waterway.
- Use of impermeable surfaces surrounding structures must be minimized to the greatest extent possible through the use of alternative design treatments, such as low impact development methods, including but not limited to, permeable pavers, green roofs, and rainwater catchments so that natural infiltration is facilitated and runoff is reduced.
- Consistent with State and Regional Water Quality Control Board regulations, runoff from impermeable surfaces must be directed to natural or landscaped areas, or to designed swales or detention/retention basins to encourage

natural filtration and infiltration. Diversion to a cistern or other onsite stormwater management technique is also allowed and encouraged.

- Avoid and minimize impacts associated with altering natural drainages and contours on the project site. If the site is graded, blend grading into the existing landform as much as possible.
- Leach fields must be sited away from creeks in accordance with the County septic ordinances, as well as at least 100 feet from the reserve boundary. Leach field installation may result in localized soil moisture content and groundwater levels that may have adverse effects on sensitive plants or plant communities in the Reserve System. Leach fields may be sited within the 100-foot setback if site-specific conditions (i.e., topography) adequately minimize effects, or adequate space is not available to site the field elsewhere (i.e., the parcel is too small).
- Adhere to Condition 3, *Maintain Hydrologic Conditions and Protect Water Quality.*
- Adhere to Condition 4, *Stream Avoidance and Minimization for In-Stream Projects*.
- Adhere to Condition 5, *Avoidance and Minimization Measures for In-Stream Operations and Maintenance*.
- Adhere to Condition 11, *Stream and Riparian Setbacks*.

Vineyards

The following conditions apply to new vineyards that are covered by the Habitat Plan (i.e., those requiring a permit from the County or other local jurisdiction) and are encouraged for new and existing vineyards that do not require a development permit.

- During construction, use cover crops, straw mulch, straw wattles/fiber rolls, coconut husks, or other equivalent erosion control mechanism to prevent sediment from being blown or washed from the project site.
- All disturbed areas will be protected during the rainy season (October 15–April 15). Permanent or temporary measures to prevent erosion must be utilized during vineyard planting. Permanent measures must be utilized once planting is completed. Erosion control measures must be in place by October 15.
- Plant vine rows along existing contours to slow runoff and reduce erosion on hillsides (California Sustainable Wine Growing Alliance 2002a).
- A stormwater management system designed for an average storm recurrence interval of not less than 25 years will be installed on the vineyard site. The system will allow excess stormwater runoff to be carried through the vineyard site with minimum erosion and consistent with the overall drainage patterns present in the area. This requirement may be met by either temporary or permanent measures while vineyard planting work is being

carried out, but shall be met by permanent measures by the time vineyard planting work is completed.

- A sediment control system designed to minimize the discharge of sediment from the vineyard site will be installed on the vineyard site. This requirement may be met by either temporary or permanent measures while vineyard planting work is being carried out, but will be met by permanent measures by the time vineyard planting work is completed.
- If open conduits are used as part of the stormwater management system, plant conduits with grasses and other vegetation to filter sediment, pesticides, and fertilizers from runoff and to reduce the potential that the stormwater conduit itself will erode.
- As part of the stormwater and sediment management systems, install vegetated swales, detention basins, extended vegetated buffer, or other similar feature on the downslope edge of the planted area to capture and treat runoff before it enters local streams. This will minimize the amount of sediment, fertilizers, and pesticides that enter local streams.
- Heavy equipment will not be utilized on dirt access roads immediately after rain to prevent roads from turning to mud and sediment from running off the roads (California Sustainable Wine Growing Alliance 2002a).
- Use of natural pest management approaches in place of pesticides is highly encouraged.
- Maintain a buffer of natural vegetation, including grasses, shrubs, or mature trees, around the perimeter of the vineyard to reduce topsoil erosion and provide habitat for birds that will prey on rodents (California Sustainable Wine Growing Alliance 2006).

Private Rural Roads

- Minimize to the maximum extent possible the amount of ground disturbance when constructing roads.
- Ground-disturbing activities associated with road construction should be timed to occur during dry weather months to reduce the possibility of landslides or other sediment being transported to local streams during wet weather.
- If construction extends into wet weather, the road bed will be surfaced with appropriate surfacing material to prevent erosion of the exposed roadbed (Pacific Watershed Associates 1994).
- Avoid, to the extent possible, constructing roads on steep slopes (over 25%) or on unstable slopes.
- If construction on steep slopes is required, construction will be timed for dry weather months to reduce the potential for landslides.
- Adhere to the avoidance and minimization measures for dirt road construction in Condition 6 under *Avoidance and Minimization Measures for Transportation Projects* (see first three bullets under heading).

Other Requirements

- Maintain as much natural vegetation as possible, consistent with fuel management standards, on the project site.
- Maintain County-mandated fuel buffer (variable width by slope conditions).
- On sites adjacent to reserves, locate the proposed development as far from the reserve boundary as possible consistent with other onsite conditions and constraints and adhere to Condition 2, *Incorporate Urban-Wildland Interface Design Elements*.
- All temporarily disturbed soils will be revegetated with native plants and/or grasses or sterile nonnative species suitable for the altered soil conditions upon completion of construction. Local watershed native plants will be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives. All disturbed areas that have been compacted shall be de-compacted prior to planting or seeding.
- All temporarily disturbed areas, such as staging areas, will be returned to pre-project or ecologically improved conditions within 1 year of completing construction or the impact will be considered permanent.
- No plants identified by the California Invasive Plant Council as invasive[12] will be planted on the project site. Planting with watershed local native and/or drought-resistant plants is highly encouraged. This reduces the need for watering as well as the need for fertilizers and pesticides.
- Outdoor lighting will be of low intensity and will utilize full cutoff fixtures to reduce light pollution of the surrounding natural areas.

Project proponents must continue to adhere to all applicable local planning ordinances including: noise ordinances, zoning ordinances, fuel management guidelines for fire buffers, NPDES permit requirements, Water Collaborative guidelines and standards, Santa Clara County grading ordinance, and drainage manual.

6.4.5 Rural Operations and Maintenance

Rural operations and maintenance activities—such as operations and maintenance of utility lines and facilities, road maintenance, vegetation management, and mitigation monitoring—have the potential to affect covered species by disturbing nesting covered bird species, leading to sediment discharge, and spreading of nonnative invasive species. Condition 8 would reduce the severity of such impacts.

[12] See <www.cal-ipc.org/ip/inventory> for the latest list of invasive species.

Condition 8. Implement Avoidance and Minimization Measures for Rural Road Maintenance

Road maintenance activities have the potential to directly affect covered species through management activities such as mowing, and may indirectly affect covered species by introducing sediment and other pollutants into downstream waterways and by spreading invasive weeds. Effects on covered species may be greatest on unpaved roads due to their erosion potential. The County maintains an extensive network of paved and unpaved roads. All roads maintained by the County Roads and Airports Department in the study area are paved, except for a portion of one road[13]. County Parks maintains an extensive network of unpaved maintenance and emergency access roads within their parks that often serve primarily as recreational trails. SCVWD maintains a small network of paved and unpaved roads, mostly on levees and along pipelines. Gilroy and Morgan Hill do not maintain any dirt roads outside of the planning limit of urban growth.

To avoid and minimize these impacts, avoidance and minimization measures were developed to address potential impacts associated with road operation and maintenance activities. The avoidance and minimization measures in this condition are based largely on the guidelines in *County Road Maintenance Guidelines for Protecting Aquatic Habitat and Salmon Fisheries* (Fishery Network of Central California Coastal Counties 2004). This manual, also called FishNet 4C, was developed by six central California counties (Mendocino, Sonoma, Marin, San Mateo, Santa Cruz and Monterey counties) and included input from cities, local Resource Conservation Districts, and water agencies. This manual identifies best management practices to protect water quality and aquatic habitat when implementing routine and emergency road maintenance activities. These guidelines incorporate avoidance and minimization measures from other road maintenance programs (e.g., the Oregon State Department of Transportation's *Road Maintenance Manual*, and the Northern Five Counties Salmon Conservation Group's *A Water Quality and Stream Habitat Protection Manual for County Road Maintenance in Northwestern California Watersheds*) (Fishery Network of Central California Coastal Counties 2004). Avoidance and minimization measures identified in the FishNet 4C guidelines are included in **Table 6-4** as part of this condition. In addition to the avoidance and minimization measures in **Table 6-4**, project proponents will comply with the avoidance and minimization measures listed below. Avoidance and minimization measures identified in this condition will be used for all covered road operation and maintenance activities.

- Projects occurring in streams or riparian setback zone will also comply with Condition 4 and Condition 5 as appropriate.
- Minimize ground disturbance to the smallest area feasible.
- Within the riparian setback zone (see Condition 11), silt fencing or other sediment control device will be installed downslope from maintenance

[13] The one unpaved road maintained by County Roads and Airports in the study area is 1.75 miles of Mount Madonna Road between Redwood Retreat Road and Summit Road (the county line).

activities that disturb soil (e.g., blading of fire or access roads within Parks or the Reserve System) to minimize the transport of sediment off site.

- In the course of rural road maintenance, no erodible materials will be deposited into watercourses. Brush, loose soils, or other debris material will not be stockpiled within stream channels or on adjacent banks where it could be washed into the channel.
- Alternatives such as mechanical control will be considered to substantially lessen any significant impact on the environment before using pesticides. Integrated pest management avoidance and minimization measures will be used for all vegetation control. Limitations may occur due to fire management requirements and local integrated pest management ordinances.
- The effects of herbicide and pesticide application will not be covered under the federal permits for this Plan. Herbicides and pesticides will be used only when necessary and will be applied in strict compliance with label requirements and state, federal, and local regulations. Herbicides and pesticides will only be applied when weather conditions will minimize drift and impacts on non-target sites.
- Maintenance activities on rural roads adjacent to natural land cover types will be seasonally timed, when safety permits and regulatory restrictions allow, to avoid or minimize adverse effects on active nests of resident and migratory birds, including covered bird species (western burrowing owl, least Bell's vireo, and tricolored blackbird). This measure is particularly relevant for right-of-way mowing[14], brush clearing, prevention of disease spread (i.e., sudden oak disease), and tree trimming. Project proponents will coordinate with the Implementing Entity to develop work schedules that optimize logistic, safety, and financial needs while minimizing potential impacts on nesting birds.
- Mowing equipment will be thoroughly cleaned before use in rural areas so they are free of noxious weeds (e.g., yellow star-thistle) and do not introduce such weeds to new areas.
- Maintenance or repair of road medians or shoulder barriers in areas that support natural land cover types (e.g., annual grassland, oak savanna, oak woodland) will not reduce the ability of wildlife of all types to move through or over them, within safety limits. Replacement or repair of road medians will be designed or installed to allow wildlife to move past these structures. Exceptions may be made by the Permittee if significant safety concerns or financial constraints arise.
- All disturbed soils will be revegetated with native plants and/or grasses or sterile nonnative species suitable for the altered soil conditions upon completion of construction. Local watershed native plants will be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-

[14] For example, County Parks has a Memorandum of Understanding with the California Department of Forestry and Fire Protection (Cal-Fire) that limits mowing to November to April to minimize fire hazards. There may be other public safety restrictions that limit the ability to achieve this guideline.

term erosion control and slow colonization by invasive nonnatives. All disturbed areas that have been compacted shall be de-compacted prior to planting or seeding.

- Ground-disturbing road maintenance activities, such as regrading, will be timed so that the moisture content of the soil will support recompaction of the soil and reduce the need for an imported water source to achieve soil compaction. Similarly, activities will be timed so that use of heavy equipment will not result in the creation of mud puddles and ruts.
- Regularly scheduled visual inspections of all roads will be conducted to identify sites where erosion is contributing sediment to local streams. Appropriate actions will be taken within the road right-of-way to manage the erosion.
- Flow lines (e.g., culverts and ditches) will be cleared annually to maintain flow lines free of debris.
- Use existing roads for access and disturbed area for staging as site constraints allow. Off-road travel will avoid sensitive communities such as wetlands and known occurrences of covered plants.
- All new public roads that are accessible to general public vehicular use will be paved (this does not include fire roads that may also serve recreational needs).

6.4.6 Reserve System Implementation

Reserve System implementation—which includes activities associated with recreation, construction, infrastructure design, and maintenance of the reserves—could result in localized effects on covered species and their habitats. All relevant conditions will be applied to construction and maintenance activities within the Reserve System.

Condition 9. Prepare and Implement a Recreation Plan

Public access, consistent with the Habitat Plan conservation strategy, will be provided on all reserves owned in fee title by a public agency. Public access to privately owned land under conservation easement will only be permitted with the landowner's consent. See Chapter 10 *Assurances* for more details.

All public access to reserves will be managed according to a recreation plan that will be developed by the landowner (e.g., County Parks, Open Space Authority) and/or the Implementing Entity consistent with the requirements of this condition. Recreation plans will be reviewed by the Implementing Entity for consistency with this condition and integrated into the applicable reserve unit management plan which will be reviewed and approved by the Permittees and the Wildlife Agencies. Wildlife Agency approval of reserve unit management plans

will follow the timelines established in Chapter 5, Section 5.2.5 *Land Management* subheading *Land Management on Reserves*.

The recreation plan will address lands that are acquired for or incorporated into a reserve unit where the Implementing Entity and the land owner determine that recreational and educational uses are compatible with the conservation strategy of this Plan. Each recreation plan will apply to the portion of the reserve unit for which the recreation plan was developed, including existing open space that is incorporated into the unit (existing open space selected for the Reserve System was chosen, in part, for its recreational uses that are compatible with the biological goals and objectives of the Plan).

At a minimum, each recreation plan will contain the requirements listed below.

- Identification of sites within reserves where recreational use is compatible with the goals and objectives of the Plan.
- Identification of acceptable forms of recreation if different from those forms identified in this condition.
- Identification of sites within reserves that contain sensitive land cover types or suitable or occupied habitat for covered species.
- Maps of existing and proposed recreational trails, staging areas, and facilities and of habitat types affected.
- Site-specific methods of recreational use controls.
- Trail and use monitoring methods, schedules, and responsibilities.
- Trail operation and maintenance guidelines and responsibilities. This includes control of active off-trail recreational activities determined inappropriate by Implementing Entity and Wildlife Agencies.
- A framework for enforcement of recreational restrictions and permitting process for restricted recreational uses.
- An evaluation determining if the impact of planned recreational use is within the limits established in the Plan and EIS/EIR, and if planned recreation is compatible with the biological goals and objectives of the Plan.
- Clear triggers for use restrictions or closure based on sensitive biological indicators (e.g., seasonal closures of some trails on the basis of activity periods of covered or sensitive species).

Land acquired for reserves will be closed to all recreational uses until a recreation plan is developed and approved as part of a reserve unit management plan. Existing recreational uses on land incorporated into the Reserve System from existing open space (e.g., County Parks) will continue until the reserve unit management plan and associated recreation plan is completed. Existing open space selected for the Reserve System was chosen, in part, because of its compatible recreation uses with the conservation strategy (see **Table 5-5** and **Figure 5-4**). Until the reserve unit management plan is completed, no additional

recreational uses beyond what is currently allowed will occur on that existing open space incorporated into the Reserve System.

Recreational uses in the Reserve System will be designed to minimize impacts on biological resources and must adhere to the requirements and guidelines listed below.

- Recreation will only be allowed where it is compatible with the biological goals and objectives of the Plan and has less-than-significant impacts on biological resources after implementation of necessary mitigation measures, as described in the EIR/EIS.
- Recreational use and impacts will be monitored by the landowner and the Implementing Entity to ensure that uses do not substantially and adversely affect covered species. If any use is found to be substantially adversely affecting covered species, that use will be discontinued until adjustments in the use can be made to reduce or eliminate impacts (see Chapter 7 for details on monitoring). The Implementing Entity will make decisions about discontinuing or modifying recreational uses in close consultation with the landowner or other applicable reserve management agency or organization, and through a public process.
- Recreational uses allowed in reserves include pedestrian use (walking, hiking, running), dogs on leash, backpacking, nonmotorized bicycle riding on designated trails, horseback riding, wildlife observation and photography, and environmental education and interpretation on designated trails at appropriate sites. Other uses may be allowed by the Implementing Entity as long as they are compatible with the biological goals and objectives of the Plan and users obtain appropriate permissions for conducting activities if needed (e.g., County Parks requires a permit for professional photography).
- Allowable recreational uses will be controlled and restricted by area and time to minimize impacts on natural communities and covered species and to ensure that the biological goals and objectives of the Plan are met. For example, trails will be closed during and immediately following heavy rains and annually winterized to minimize erosion and sedimentation. Additional types of recreational uses (e.g., horse carts on trails) may be allowed if the Implementing Entity determines that they are consistent with the biological goals and objectives of the Plan, CDFG and USFWS concur, and users obtain appropriate permissions for conducting activities if needed (e.g., County Parks requires a permit for use of horse carts).
- Activities will be allowed in keeping with the ecological needs of the given habitat. Any off trail activities and other active recreation not listed above (e.g., outdoor sports, geocaching) unless otherwise authorized by the Implementing Entity are prohibited. Recreational uses will be allowed only during daylight hours and designated times of the year (i.e., limited seasonal closures to protect sensitive covered species; see below for specific examples) unless authorized through a use permit (i.e., backpacking). Exceptions may be made for educational groups and events that are guided by an Implementing Entity staff person or docent approved by the Implementing Entity.

- New staging areas will be developed to the extent possible in areas within reserves that are already disturbed and not suitable for habitat restoration, and that do not contribute to the conservation biological objectives for covered species habitats and/or natural communities. Sites at the edges of reserves will be chosen over sites on the interior of reserves.
- No motorized vehicles or boats will be allowed in reserves, except for use by the reserve manager staff or with the prior approval of the reserve manager (e.g., contractors implementing Plan conservation actions such as habitat restoration and monitoring, grazing tenants, fire-suppression personnel, and maintenance contractors). For reserves under conservation easements, vehicle use will be allowed as part of the regular use of the land (e.g., agricultural operations, permanent residents, utilities, police and fire departments, other easement holders), as specified in the easement.
- When compatible with Plan biological goals and objectives, dogs may be allowed in daylight hours in designated reserves or in designated areas of reserves, but only on leash. Leash law restrictions will be strictly enforced by reserve managers and staff because of the potential impact of dogs on covered species such as San Joaquin kit fox, western burrowing owl, California red-legged frog, and California tiger salamander. Leash enforcement may include citations and fines. Dogs used for herding purposes by grazing lessees must be under verbal control and have proof of vaccination.
- Recreational hunting or fishing within reserves will be prohibited except in limited circumstances. Landowners who have hunted large game (e.g., deer, elk, turkey, or pigs) on their property that becomes part of the Reserve System through a conservation easement will be allowed to continue this use as long as it is consistent with the biological goals and objectives of the Plan. Similarly, hunting for management purposes (e.g., feral pigs) is encouraged where it will contribute to achieving the goals and objectives of the Plan. The Implementing Entity will develop management hunting protocols on new reserve lands in coordination with other agencies who utilize hunting for management purposes (e.g., CDFG). Fishing is currently allowed in some County parks that will be added to the Reserve System. To be consistent with this condition, lakes or ponds in which fishing will continue will not be included in the Reserve System.
- Picnic areas shall be operated during daylight hours only. No irrigated turf or landscaping shall be allowed in picnic areas. To the extent feasible, picnic areas will be located on the perimeter of preserve areas and will be sited in already disturbed areas. No private vehicles shall be allowed in picnic areas, unless the picnic area is at a staging area and except for limited special events approved by the Implementing Entity. Maintenance and emergency vehicles shall be permitted access to picnic areas.
- Backpack camps shall be limited to use by no more than 25 people at each site. With the exception of Americans with Disabilities Act (ADA) service animals, dogs shall only be allowed in backpack camps on-leash. In coordination with the reserve manager, the Implementing Entity will monitor

use and maintenance of backpack camps and may implement a reservation and permitting process for use of backpack camps.

- Public collecting of native species will be prohibited within reserves.
- Introduction of domestic or feral animals, including cats, ducks, fish, reptiles, and any exotic non-naturalized species, is prohibited within the reserves to prevent interference with and mortality of native species, except by the reserve manager for management purposes (e.g., livestock for grazing or dogs for livestock control or protection).
- Trails will be established on existing roads or trails wherever possible to minimize the need for new ground-disturbing activities and to reduce new and ongoing maintenance costs. However, this will be balanced with the need to reroute some poorly designed existing ranch roads that are difficult and expensive to maintain. In some cases, rerouting access roads may have net benefits on biological resources.
- New trails will be designed and operated to be compatible with natural resources protection. New trails will be sited to minimize impacts on sensitive species (including covered species) and natural communities as well as disturbance to adjacent landowners and land uses. Wetlands will be avoided except for educational trails, and trails through woodland or riparian habitat will avoid tree removal or substantial pruning to the extent possible. If tree removal is required, unhealthy, exotic tree species, or trees unlikely to reach maturity due to site conditions (e.g., being shaded out by larger trees) will be targeted for removal.
- Trails built across streams or through riparian corridors will be sited and designed with the smallest footprint necessary to cross the in-stream area. Stream crossings will be perpendicular to the channel and be designed to avoid any potential for future erosion. Trails that follow a stream course will be sited outside the riparian corridor to the maximum extent feasible.
- Trails will not be paved, except as required by law, and will be sited and designed so that they do not contribute to erosion and bank failure. To provide trail access for a range of user capabilities and needs (including persons with physical limitations) in a manner consistent with state and federal regulations, the landowner would site and design new, paved trails in areas within reserves that are already disturbed and do not have the potential to affect sensitive habitat. As common practice, these types of whole-access trails would be sited near staging areas.
- Recreational uses will be controlled using a variety of techniques including fences, gates, clearly signed trails, educational kiosks, trail maps and brochures, interpretive programs, and patrol by land management staff.
- Construction of recreational facilities within reserves will be limited to those structures necessary to directly support the authorized recreational use of the reserve. Existing facilities will be used where possible. Facilities that support recreation and that may be compatible with the reserve include parking lots (e.g., small gravel or paved lots), trails (unpaved or paved as required by law), educational and informational kiosks, up to one visitor

center located in a disturbed or non-sensitive area, and restroom facilities located and designed to have minimal impacts on habitat. Playgrounds, irrigated turf, off-highway vehicle trails, and other facilities that are incompatible with the goals and objectives of this Plan will not be constructed.

- Signs and informational kiosks will be installed to inform recreational users of the sensitivity of the resources in the reserve, the need to stay on designated trails, and the danger to biological resources of introducing wildlife or plants into the reserve.
- New trails will be prohibited within 100 feet of wetlands and streams that provide suitable habitat for covered amphibians and aquatic reptiles or tricolored blackbird, unless topography or other landscape characteristics shield these trails from the covered species habitat or a lack of effect of the trail on the species can be otherwise demonstrated.
- New trails will be prohibited within 250 feet of active western burrowing owl nests. If an owl pair nests within 250 feet of an active trail, Implementing Entity staff will consult with the Wildlife Agencies to determine the appropriate action to take. Actions may include prohibiting trail use until young have fledged and are no longer dependant on the nest.
- When compatible with Plan biological goals and objectives, recreation plans for reserves adjacent to existing public lands will try to ensure consistency in recreational uses across open space boundaries to minimize confusion in the public. Reserves adjacent to non-Plan public lands with different recreational uses will provide clear signage to explain these differences to users that cross boundary lines. The Implementing Entity will be responsible for securing and signing reserve boundaries.

Rare exceptions to the guidelines listed above will be considered and approved by the Implementing Entity and the Wildlife Agencies on a case-by-case basis. Exceptions will be approved only if they are consistent with the biological goals and objectives of the Plan. Any exceptions will be clearly identified in the recreation plan.

Condition 10. Fuel Buffer

In accordance with state law[15], all applicable covered activities will remove all brush, flammable vegetation, or combustible growth within at least 30 feet and up to 100 feet of occupied dwellings or structures. The amount of fuel modification necessary shall take into account the flammability of the structure as affected by building material, building standards, location, slope, and type of vegetation. Fuels will be maintained in a condition so that a wildfire burning under average weather conditions would be unlikely to ignite the structure. The intensity of fuels management may vary within the 100-foot buffer of the structure, the most intense being within the first 30 feet around the structure.

[15] California Government Code Section 51182 and Public Resources Code 4291.

Consistent with fuels management objectives, steps will be taken to minimize erosion consistent with Condition 7.

Applicable covered activities include construction of new structures in the Diablo Range or Santa Cruz Mountains, or new structures built in grassland, chaparral, oak woodland, or conifer woodland land cover types. This condition also applies to structures built in areas designated by the County as a very high fire hazard severity zone pursuant to Section 51179 of the California Government Code.

If the property line is less than 30 feet from the occupied structure, then the brush and vegetation will be cleared up to the property line in order to maintain compliance with Public Resources Code 4291. Additional brush and vegetation clearing may be required by local or other state laws. To ensure that erosion is minimized, grass and other vegetation within 30 feet of structures will be maintained within this fuel buffer to a height of 18 inches or less. The cost of establishing and maintaining this fuel buffer will be borne by the project proponent. This condition does not apply to single trees or other vegetation that is well-pruned and maintained so as to effectively manage fuels and not form a means of rapidly transmitting fire from other nearby vegetation to a dwelling or structure.

The vast majority of properties adjacent to the Reserve System are expected to be able to create sufficient defensible space within their property to meet this condition. If an additional buffer is deemed necessary by the responsible fire agency, then the private landowner may seek an encroachment permit from the Implementing Entity to meet fire code. In these limited instances, the Implementing Entity may decide to allow a fuel buffer on the reserve side of a property boundary to provide additional protection against wildland fire. The Implementing Entity or land manager would define the allowable activities in encroachment permit to ensure compliance with HCP goals. If this is applied, the fuel management buffer within the reserve will not be credited to the land acquisition requirements in Chapter 5 because this area will be maintained in a disturbed state.

In areas within the Reserve System where management of fuel loads is necessary, the Implementing Entity will trim, mow, conduct prescribed burns, utilize grazing, or otherwise clear vegetation to minimize fuel loads and fire hazards. Various land uses are allowable within the fuel management buffer as long as they reduce fire hazards. Uses such as trails, fire-resistant landscaping, and livestock grazing are compatible with the fuel buffer. Allowable uses must comply with the urban-Reserve System interface guidelines described above.

Creating and maintaining the fuel management buffer within the Reserve System may have impacts on covered species. For example, plants such as Santa Clara Valley dudleya and smooth lessingia may occur in grasslands within fuel buffers. Any impacts on covered plants from fuel buffer management will be counted by the Implementing Entity as an adverse effect that must be offset by conservation of covered plants in the Reserve System (see Chapter 5). In some cases,

maintenance of the fuel buffer may improve habitat for covered plants by reducing cover of nonnative plants.

6.5 Conditions to Minimize Impacts on Natural Communities

Conditions 11–14, described below, are designed to minimize impacts on natural communities identified as representing important ecosystems in the Plan area.

Condition 11. Stream and Riparian Setbacks

This condition applies to all covered activities that may impact streams. This includes all development inside the urban service area where a stream or the stream setback overlaps any portion of the parcel on which a covered activity is being implemented. Outside the urban service area, this includes all covered activities where a stream or stream setback overlaps any portion of the development area or project footprint. Exemptions and exceptions may apply as described below in this condition.

Background

The management of stream corridors and associated riparian habitat through the implementation of setbacks has become an increasingly important tool for conserving aquatic and semi-aquatic populations and riparian vegetation and improving water quality. There is strong evidence that riparian buffers of sufficient width protect and improve water quality by intercepting non-point source pollutants in surface and shallow subsurface water flow (e.g., Lowrance et al. 1984; Castelle et al. 1994).

Healthy riparian buffers are also widely recognized for their ability to perform a variety of physical and biological functions other than improving water quality. These functions include stabilizing stream channels; controlling erosion by regulating sediment storage, transport, and distribution; providing organic matter (e.g., leaves and large woody debris) that is critical for aquatic organisms; storing nutrients for the surrounding watershed; reducing water temperature through shading; minimizing flood peaks; and serving as key recharge points for renewing groundwater supplies (DeBano and Schmidt 1989; O'Laughlin and Belt 1995). Riparian buffers also provide habitat for a large variety of plant and animal species. Riparian buffers have been proposed, and in some cases proven, to be landscape components that promote wildlife movement, enhance gene flow, increase connectivity of isolated habitat patches, and provide breeding and foraging habitats for animals (Hilty et al. 2006; Rosenberg et al. 1997).

Within the study area, streams provide important breeding, foraging, and movement habitat for California red-legged frog, foothill yellow-legged frog, and western pond turtle. Riparian woodland, which is found next to many of the study area's streams, provides breeding sites for tricolored blackbird and least Bell's vireo. Riparian woodland habitat also protects water quality by filtering inflow, thus reducing pollutant input and sediment load. Finally, stream and riparian areas provide key linkages connecting conservation areas targeted under the Habitat Plan (see **Table 5-9** and **Figure 5-6**).

Because of the importance of streams and associated riparian woodland for the benefit of covered species and as sensitive land cover types addressed by this Plan, this condition was developed to be as protective as feasible within the land-use constraints of the local jurisdictions and financial constraints of the Habitat Plan. The following principles were developed to guide the stream and riparian setback condition for this Plan.

- Stream habitat and functions are very difficult to replace once lost; in some cases they cannot be replaced.
- Stream setbacks will be required for all covered activities occurring near streams and riparian areas to minimize effects on covered species as required under the ESA and NCCPA. Additional protections adjacent to streams may also be required for urban redevelopment projects.
- Each of the cities participating in the Habitat Plan, as well as the County, has either setback regulations (Morgan Hill) or policies (San José, Gilroy, County of Santa Clara) currently in place. However, these regulations and policies are not consistent among the jurisdictions. A condition is needed that will make regulatory guidance consistent for all covered activities across all jurisdictions. All covered activities must adhere to both the applicable existing local regulations and the requirements of the Plan.
- The main goal of the stream setback requirement is to minimize further degradation of stream and riparian communities from implementation of covered activities and to maintain basic biological and physical functions of stream and riparian systems.
- The purpose of the stream setback requirement within the urban service area is to, at a minimum, protect stream and riparian communities that provide habitat for covered species because these habitats are unique and cannot be conserved elsewhere within the study area.

Protection of streams and adjacent riparian vegetation under this condition would conserve habitat for California red-legged frog, foothill yellow-legged frog, western pond turtle, and least Bell's vireo. All of these species use stream and riparian habitats as either primary or secondary habitat, as described in Chapter 3, *Physical and Biological Resources*.

An analysis was performed to determine the overall value of the setback for protecting covered species' habitat. Modeled habitat protected by the setback was quantified and compared to the level of protection provided by the Reserve System alone. In GIS the habitat models for four covered species (California

red-legged frog, foothill yellow-legged frog, western pond turtle, and least Bell's vireo) were overlaid with the expected locations and widths of riparian setbacks outside of the planning limit of urban growth (setback avoidance is not required inside the urban service area and so those areas were not included in this analysis) for all covered activities except rural residential development (exact location of rural residential development is not known at this time and thus could not be included in the analysis). Assuming all of these covered activities occur, an additional 2,855 acres (28%) of modeled breeding (primary) habitat for California red-legged frog and an additional 348 miles (50%) of modeled habitat (primary and secondary) for foothill yellow-legged frog would be avoided. Also, implementation of the stream setback would avoid an additional 837 acres (55%) of modeled habitat for least Bell's vireo. Setback benefits to these species and western pond turtle are summarized in **Table 6-5**. Stream habitat for covered species will likely overlap (i.e., miles and acres referenced in the table and above are not additive).

Definitions

The following terms are defined for this condition. These definitions are also found in the glossary (**Appendix A**).

Riparian habitat or riparian vegetation: Riparian vegetation is associated with river, stream, or lake banks and floodplains. Riparian vegetation is also defined by USFWS (2009) as plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent lotic and lentic water bodies (i.e., rivers, streams, lakes, or other watercourses). Riparian areas have one or both of the following characteristics: 1) distinctively different vegetation than adjacent areas, 2) species similar to adjacent areas but exhibiting more vigorous or robust growth forms due to the greater availability of surface and subsurface water.

Stream: A watercourse that flows at least periodically or intermittently through a bed or channel having banks. This may include watercourses having a surface or subsurface flow that supports or has supported riparian vegetation, fish or other aquatic life. In the context of the Habitat Plan, a watercourse must meet SCVWD "*Criteria to Verify or Identify a Watercourse as a Stream*" discussed below under *Framework* (Santa Clara Valley Water Resources Protection Collaborative 2006) to qualify as a stream.

Reach: A section of a stream. Reaches are defined based on a specific need (e.g., monitoring) and do not necessarily reflect a standard set of characteristics.

Perennial stream: A stream with year-round surface flow that is supplied by both rainfall runoff and groundwater, as well as by substantial dry-season inputs (e.g., runoff).

Intermittent stream: A stream that is supplied by both rainfall runoff and groundwater. Intermittent streams tend to be seasonal, with flow during the rainy season and into the late spring or early summer.

Ephemeral stream: A stream that flows only in response to rain events and receives no groundwater input. As defined in the Habitat Plan, ephemeral streams will not include irrigation ditches, underground streams, or drainages and swales that have neither defined bed and bank nor evidence of scour or sediment transport. All other ephemeral drainages that qualify as streams will be considered under the Habitat Plan.

Framework

This condition will apply to all covered activities, including those within the Reserve System. This condition also has exemptions and exceptions as described in subsequent sections below.

The width of the setback is driven by the following criteria:

- stream community,
- slope, and
- location of the covered activity in relation to the urban service area of each local jurisdiction.

Each of these criteria is described below.

Stream Community

Stream communities are grouped into two simplified categories for the purposes of this condition. These categories are based on broad definitions of the biological characteristics of those communities and correspond to the level of habitat quality for covered species and sensitive riparian communities within the study area. Categories for the stream setback requirement are provided below.

- **Category 1**. This stream type has sufficient flow to support covered species and riparian habitat. These streams include perennial streams and some intermittent streams. These streams are typically larger than ephemeral drainages and support movement of covered species along the length of the stream. The ability of these streams to also support healthy riparian habitats bolsters the ecological value of the stream. This category also includes all in-channel ponds downstream of reservoirs. These streams are shown in **Figure 6-2**[16]**.**
- **Category 2**. This stream type may not have sufficient flow to support covered species and riparian habitat. These streams include all ephemeral streams and some intermittent stream reaches. These reaches provide minimum support of water-quality functions and primary breeding habitat for

[16] **Figure 6-2** may be periodically updated by the Implementing Entity in consultation with the Wildlife Agencies as new data becomes available.

covered species. Category 2 streams are not specifically mapped as part of the Habitat Plan. They include both identified streams (named creeks and USGS blueline creeks) that are not classified as Category 1 streams (as shown in **Figure 6-2**) and other unmapped streams that meet the "Criteria to Verify or Identify a Watercourse as a Stream" as defined below.

Categories are applied to reaches of streams as opposed to entire streams. This is because almost all streams begin in the uppermost portions of their watersheds as ephemeral streams and gradually become intermittent or perennial and they move downslope and accumulate flows from the watershed and, sometimes, the groundwater basin. As such, a single stream may contain both Category 1 and Category 2 reaches.

The mapped stream network for the Habitat Plan does not differentiate between perennial, intermittent, and ephemeral drainages. However, SCVWD developed a map of all fish-bearing streams in the study area. While fish are not covered by this Plan, presence of fish is a good indicator of the stream type. For example, ephemeral streams do not generally support fish. As such, the stream categories are identified using fish-bearing or non-fish bearing streams as a proxy for Category 1 and Category 2 streams, respectively. Reaches for which fish data are unknown are assumed not to support fish and are included in Category 2. Category 2 reaches cannot occur downstream of a Category 1 reach.

Criteria to Verify or Identify a Watercourse as a Stream
While all Category 1 streams are mapped by the Plan, not all Category 2 streams are mapped. If a watercourse is not mapped by the Plan, but does meet the following criteria, it will be classified as a Category 2 stream. The following is based on the *Santa Clara Valley Water Resources Protection Collaborative* (2006).

A watercourse which does not appear to fit into one of the two described stream categories may be considered a stream if the director of the planning department of the local jurisdiction determines that the watercourse complies with all of the following three criteria:

1. the watercourse is hydrologically connected to a waterway above and below the site or is connected to a spring, headwaters, lake, and/or bay based on satisfying at least one of the conditions identified in paragraph (A) below; and
2. the watercourse is within a defined channel which includes a bed, bank, and exhibits features that indicate actual or potential sediment movement based on satisfying at least one of the conditions identified in paragraph (B) below; and
3. the watercourse occupies a specific topographic position based on satisfying at least one of the conditions identified in paragraph (C) below.

In determining whether the subject watercourse possesses these three features, the following criteria will be examined by the Local Partner with jurisdiction over the covered activity. If necessary, this determination may require the

technical expertise and recommendations of a qualified biologist, hydrologist, or other qualified professional. In addition, the Local Partner with jurisdiction over the covered activity may require the project proponent to provide additional information as deemed necessary to determine if the watercourse satisfies the three criteria listed below.

This process will not be used to determine if a CDFG Streambed Alteration Agreement will be required pursuant to Section 1600 et seq. of the California Fish and Game Code or to determine if a Corps Section 404 Clean Water Act permit will be required.

A. Hydrologic Connectivity—Criterion #1 above will be considered met if any of the following conditions are present:

1. Stream headwaters, springs, in-channel culverts, underground seepage, or groundwater flow are present and capable of providing hydrologic connectivity to recognized watercourses. Sections of stream placed underground by manmade infrastructure (e.g., culverts) are not considered streams for the purpose of this condition except as noted in paragraph B item 4 below.

2. Streams may become connected across or over manmade improvements such as roads (e.g., a temporary connection during a storm event). Except for stream channel improvements, water flowing across or over such improvements within the public right-of-way is not considered a stream. Sections above and/or below this connectivity are streams if they meet the other required features.

3. Springs are present and are considered part of a stream if located above (uphill from) stream initiation.

B. Channel Form—Criterion #2 above will be considered met if any of the following conditions are present:

1. The watercourse has a stream channel, beginning at the point of bed and bank initiation, which may be natural, altered, or engineered.

2. The stream channel must have enough flow under present-day conditions to maintain channel form and to move sediment. A non-engineered stream channel bed and bank are created and maintained by erosion and sedimentation, thus the presence of a channel with bed and bank is itself evidence of sufficient flow. Flow volume or timing is not criteria for stream determination.

3. The stream channel has evidence of scour, sedimentation, sediment sorting, undercut banks and/or other erosion, deposition, or transport features —all of which support sediment movement.

   Engineered or altered channels exist and are partially or wholly made of earth, concrete, rip rap, or other materials. The hardened nature of these channels bed and banks, and a lack of available sediment along the channel reach, may prevent signs of sediment movement or scour. Such channels need not have explicit evidence of sediment transport.

4. A currently underground stream was filled without appropriate permits from all applicable regulatory agencies (federal, state, and local) or is underground due to a landslide.

C. Topographic Position—Criterion #3 above will be considered met if any of the following conditions are present:

1. The watercourse is either a 'U' or 'V' shaped channel typically located at the low point of a macro-topographic feature.
2. The watercourse consists of bowl, 'U', or 'V' shaped topography with high points draining to valley or ravine as part of a large drainage network leading to large streams, lakes and/or a bay.
3. The watercourse located on flatland consists of shallow bowl or 'U' shaped topography. Generally these streams flow from the hills toward a bay following the slope of the land.

Stream topography can be indicated on a topography map by a 'U' or 'V' shape pointed in the uphill direction.

Slope

Slope is an important determinant of soil stability and therefore erosion and sedimentation rates into streams. Steeper slopes erode faster and are more susceptible to disturbance by the covered activities. To account for these factors, stream setback requirements are greater on steeper slopes. The slope categories developed for the Habitat Plan were based on slope-stability categories in local codes and guidelines. Two slope categories were created. Slope categories are as follows.

- **0%–30% Slopes**. Generally stable slopes. This category does not require additional setbacks beyond those identified above.
- **>30% Slopes**. Increasingly unstable slopes. This category requires increase protection and greater stream setbacks.

If the development area as described in Condition 7 is located within 200 feet of a Category 1 stream, the project proponent will include site topography on the development area map (see Section 6.8.2 *Item 2: Project Description and Map*) in 5-foot intervals in elevation. The project proponent will also calculate the average slope of the development area to determine how this criterion is applied. Slope is defined as the average natural slope of the land within the proposed development area based on an engineered site plan. The average slope is determined by the formula:

$S = (I*L/ A)*100$, where

S is the average slope of the area in percent; *I* is the contour interval in feet; *L* is the combined length of contour lines in feet; and A is the area of the development area. Average site slope will be calculated by a registered civil engineer or licensed land surveyor. **Figure 6-3a** illustrates an example setback based on slope.

Urban Service Area

Different setback distances will be applied depending on whether the covered activity occurs within the urban service area[17] (as adopted and mapped by LAFCO and defined by each city's General Plan at the time of adoption of the Habitat Plan) or outside the urban service area. Within the urban service area of San José, Morgan Hill, and Gilroy, there is typically extensive existing urban development. Due to past land-use policies, this development may have limited or no setbacks from streams. As such, these areas tend to be developed or highly altered from a natural state and the overall habitat value for covered species is less than in the rural areas. The stream setback requirement for covered activities within the urban service area is therefore modest and consistent with existing land uses. This setback also recognizes the limited potential for new development within the urban service area to provide stream protections.

Outside of the urban service area, stream setbacks are greater to maximize protection of existing stream functions and values and to provide additional opportunities for stream and riparian protection and restoration (see Chapter 5). Stream setbacks outside the urban service area take into account the opportunity to establish protective setbacks and to pro-actively prevent degradation seen within the urban service area from past development. The difference between setbacks inside and outside of the urban service area reflects the fact that lands within the urban service area provide a minimum amount of habitat in support of basic ecological functions including connectivity for covered species, while stream and riparian habitat outside of the urban service area will be instrumental in successful implementation of the conservation strategy.

Required Setbacks

Stream setback requirements have been developed on the basis of an extensive literature review of applicable research from both local and national sources (**Table 6-6**) and in consultation with the Wildlife Agencies. Scientific studies to determine minimum setbacks typically recommend relatively modest setbacks (an average of 58 feet) to protect water quality (e.g., sediment and nutrient loading). Recommended setbacks to enhance stream ecology were greater and ranged from 85 to 220 feet with an average of 132 feet. Setbacks intended to provide protection for plants and wildlife were the greatest and ranged from 30 to 1,600 feet, with an average range of 335 to 410 feet (**Table 6-6**).

Working from scientifically rigorous definitions of appropriate setbacks, further refinement of setbacks was coordinated with the Local Partners to determine setback widths that, while consistent with the literature, limited the number of situations in which the setback would create undue hardship upon property owners or be infeasible to implement on a consistent basis (the setback would

[17] The urban service area was used instead of the planning limit of urban growth because the urban service area represents the current boundary of urban development, not the future boundary after implementation of all covered activities. The Local Partners felt strongly that stricter riparian setbacks should be applied outside the urban service area to maximize protection of stream and riparian areas prior to urbanization of these areas.

create a large number of property exemptions). As such, the setbacks identified for this Plan (35 to 250 feet) balance the need to protect ecological functions with surrounding land uses and private property constraints.

A stream setback, measured from top of the stream bank, will be applied to all covered activities as shown in **Table 6-7**. To facilitate implementation of this condition, required setbacks are described below based on project location. **Figures 6-3a through 6-3d** illustrate different applications of the setback.

Inside the Urban Service Area

Inside the urban service area at the time of Plan adoption, the setback for Category 1 streams is 100 feet (**Figure 6-3b**). The setback is increased by 50 feet for parcels with slopes greater than 30% to compensate for increased slope instability and higher anticipated rates of erosion. In addition, if the site supports riparian vegetation the setback is equal to either the riparian edge plus a 35 foot buffer or the setback as defined above, whichever is greater.

The setback for all Category 2 streams is 35 feet regardless of location or slope (see **Figure 6-3c**). In addition, if the site supports riparian vegetation, the setback is extended to include the riparian edge plus a 35-foot buffer. The 35-foot buffer is based on a minimum setback distance of 33 feet suggested for sediment and nutrient reduction (Corley et al. 1999). Ephemeral streams, while constituting the majority of streams affected by this condition, are not commonly mapped due to inherent difficulties in mapping ephemeral tributaries in the study area. Unmapped ephemeral streams will only be subject to the required setback if the criteria for defining a watercourse discussed under *Framework* are met for hydrologic connectivity, channel form, and topographic position (Santa Clara Valley Water Resources Protection Collaborative 2006). The applicable local jurisdiction is responsible for making determinations of whether a watercourse qualifies as a Category 2 stream and for implementing setbacks. Each local jurisdiction may also choose to extend the setback beyond 35 feet in cases where site-specific slope and geological characteristics warrant increased protection.

If the project proponent complies with the stream setback when implementing covered activities (i.e., the project avoids the setback), the area of the setback will be excluded from the development fee calculation for the project. The project will be tracked as the parcel or development area excluding the avoided setback so that local jurisdictions are able to identify new impacts in future project applications.

Outside the Urban Service Area

Outside of the urban service area, setback requirements are greater. For Category 1 streams the setback distance is 150 feet (see **Figure 6-3d**). The setback is increased by 50 feet for slopes greater than 30% to compensate for increased slope instability and higher anticipated rates of erosion (**Figure 6-3a**). In addition, if the site supports riparian vegetation, the setback is either the riparian edge plus a 35-foot buffer or the setback described above, whichever is greater.

As described above for required setbacks "*Inside the Urban Service Area*," the setback for all Category 2 streams is 35 feet regardless of location or slope (**Figure 6-3c**). If the site supports riparian vegetation, the setback will extend from the riparian edge plus a 35-foot buffer.

Unless a covered activity meets the "Exemption" criteria or is granted a stream setback exception, as described below, implementation of covered activities is prohibited within the stream setback.

Project proponents of projects located outside the urban service area must ensure that the development area does not encroach into the stream setback unless an exemption or an exception is applied. Projects or portions of projects that qualify for an exemption or exception are described below.

If a project proponent chooses to offer a conservation easement onstream setback areas, and the Implementing Entity and Wildlife Agencies approve, the contribution of the area placed under conservation easement may offset development fees as described below under *Fees and Conservation Easements*, and the land will become part of the Reserve System and contribute to the Plan's requirements for riparian preservation (**Table 5-13**).

Exemptions

The exemptions below apply regardless of location. If a covered activity qualifies for an exemption, a stream setback is not applied and the project proponent is not required to comply with this condition. However, other conditions may still apply and the project is still required to pay all applicable fees (e.g., land cover fee, wetland fee) as described in Chapter 9. Exemptions from the stream setback include the following.

1. Any activity that is not a covered activity and not subject to the Habitat Plan or its conditions.
2. Activities listed as exempt in Section 6.2.
3. Development on parcels less than 0.5 acre.
4. Covered activities that require work within or adjacent to streams such as bridges, levee maintenance and repair, flood-protection projects, stream maintenance, outfall installation and maintenance, flood-protection capital projects, dam-related capital projects.
5. Recreational trails (see Condition 4 and 9 for details on trail siting).
6. Replacement of utilities that result in no new permanent disturbance to the riparian corridor during construction and operation and generate only temporary loss of habitat. (This exemption does not apply for utility projects that result in new permanent riparian impacts.)
7. Stream crossings essential to provide a means of access to parcel or facility.

Exceptions

Stream setback policies that apply to a large number of parcels with varying characteristics require a clear and practical set of exceptions. The term exception means an allowance for reductions in mandated setback distances necessary to allow reasonable use and development of a property based on the variety of constraints and factors that may affect the property. In situations where exceptions are granted, portions of this stream setback condition may still apply. Exceptions will be used in a minority of cases with special circumstances that limit or restrict the ability of a landowner to fully apply the stream setback. For example, geologic and seismic hazards, unusual lot size or configurations, unusual slope, or grading and access issues may present site constraints that require exceptions to the stream setback condition in order to allow reasonable development of a site consistent with local land use regulations.

For all proposed exceptions to the stream setbacks (inside or outside the urban service area), exceptions will be considered based on the following factors:

1. The existence of legal uses within the setback.
2. The extent to which meeting the required setback would result in a demonstrable hardship (i.e., denies an owner any economically viable use of his land or adversely affects recognized real property interests) for the applicant.
3. The extent to which meeting the required setback would require deviation from, exceptions to, or variances from other established policies, ordinances or standards regarding grading, access, water supply, wastewater treatment, disposal systems, geologic hazards, zoning, or other established code standards.
4. The stream setback exception does not preclude achieving the biological goals and objectives of the Habitat Plan or conflict with other applicable requirements of the Habitat Plan and local policies.

Regardless of project location, stream setback exceptions may not reduce a Category 1 stream setback to less than a distance of 50 feet for new development or 35 feet for existing or previously developed sites with legal buildings and uses (**Figure 6-3b**). All applicable fees must be paid for areas granted an exception.

Exceptions may be requested through the standard application process described in Section 6.8, or through a separate request process. Applicants must apply for a stream-setback exception through their local jurisdiction. All private applications for stream-setback exceptions must be reviewed and approved by the local jurisdiction. For projects implemented by a local jurisdiction, exception requests must be made to the Implementing Entity. The findings required to approve the stream setback exception must be supported by factual information and judgments in the record.

As part of the review process, the local jurisdiction or the Implementing Entity must consider the implications of a reduced setback on the riparian system and

covered species, progress toward the biological goals and objective of the Plan, and potential effects on adjacent properties. The local jurisdiction or the Implementing Entity must make written findings that document these considerations and the rationale for the stream-setback exception (see below for specific required findings). The local jurisdiction or the Implementing Entity may require technical reports from qualified professionals or consultants to support the application or request. For example, for any significant proposed reduction, a report by a qualified biologist, stream hydrologist, registered engineer, or other professional may be required as a basis for making necessary findings. Please see Section 6.8.5 for definition of a "qualified biologist."

If the stream setback exception is granted at an administrative level (Zoning Administrator) or by a designated decision-making authority (Planning Commission), local agencies must include provisions that allow appeal of this decision to the elected legislative body of the applicable agency. Applicable fees may be imposed by the legislative body for processing such appeals, as well as for the original exception requests.

Prior to granting the exception, the local jurisdiction will provide the exception request and proposed decision to both the Implementing Entity and the Wildlife Agencies for review and comment. The Implementing Entity and Wildlife Agencies will have 30 days to review the request and provide a written response. A local agency cannot take an action until after that 30 day-period. The Implementing Entity will compile a list of all exceptions granted each calendar year for inclusion in the annual report to the Wildlife Agencies.

Fees and Conservation Easements

If the stream setback is precluded from future development by a permanent conservation easement offered voluntarily by the landowner, and the easement is acceptable to the Implementing Entity and Wildlife Agencies and consistent with the Plan Reserve System (as described in Chapter 8, Section 8.6.3), a portion of the land cover fee for the covered activity (i.e., the fee for impacts to land cover types outside of the setback) may be waived by the Implementing Entity. If the value of the easement, in terms of area and resource value, exceeds the fee, credit cannot be "banked" for other projects (i.e., the Implementing Entity will not compensate for excess credit). Partial fee waivers for setbacks will be determined on a case-by-case basis by the Implementing Entity according to the criteria in Chapter 9, Section 9.4.1, subheading *Land Provided in Lieu of Development Fee.*

Each local jurisdiction may also consider imposing a conservation easement as a requirement for development approval when there is a direct nexus between the effects or impacts of a project and the need for an easement. The Implementing Entity will provide technical assistance to the local jurisdiction to determine whether a conservation easement is warranted. An easement must also demonstrate rough proportionality with the impact of the project.

Condition 12. Wetland and Pond Avoidance and Minimization

The purpose of this condition is to minimize direct and indirect impacts to wetlands and ponds and in some cases, avoid direct and indirect impacts to high quality wetlands and ponds. Direct impacts are those that directly affect a wetland or a pond within its mapped boundary (see Section 6.8.4 *Item 4: Map of Wetlands and Waters* for a description of mapping direct impacts to wetlands). Project proponents are required to pay a wetland fee for impacts to wetlands and ponds to cover the cost of restoration or creation of aquatic land cover types required by this Plan (see Chapter 9 for details on this wetland fee). Covered activities can avoid paying the wetland fee if they avoid impacts to the wetland.

All project proponents will implement the following actions to avoid and minimize impacts of covered activities on wetlands and ponds.

Planning Actions

- Projects must be designed to avoid and minimize impacts to wetlands to the maximum extent practicable.
- Applicants with streams on site must follow the stream setback requirements in Condition 11.
- Applicants for coverage under the Plan must follow the requirements and guidelines in Condition 3 to minimize the effects of development on downstream hydrology, streams, and wetlands.

Design

- Locate septic facilities, if used, at least 100 feet from the edge of a wetland or pond if space allows.
- If the runoff from the development will flow within 100 feet of a wetland or pond, install vegetated stormwater filtration features, such as rain gardens, grass swales, tree box filters, or infiltration basins, to capture and treat flows.
- Plant native vegetation (shrubs and small trees) between the wetland or pond and the development such that the line of sight between the wetland or pond and the development is shielded.
- If during the environmental review process it is shown that a project has adverse indirect impacts to the wetland's function (change in hydrological functions, etc.), the project will be required to avoid these indirect effects, as determined on a case-by-case approach by the local jurisdiction, in consultation with the Implementing Entity. If a Local Partner is carrying out the activity, it will coordinate avoidance measures with the Implementing Entity. Wetlands that are not completely avoided, including indirect effects, will be considered permanently impacted and will count towards the impact

caps described in **Table 4-2** and will be assessed fees as described in Chapter 9. If however, the local jurisdiction demonstrates to the Wildlife Agencies that the wetlands to be indirectly affected are highly degraded prior to project impacts, and the Wildlife Agencies agree, impacts will not be counted toward the impact caps described in **Table 4-2** and fees will not be assessed. "Highly degraded" wetlands could include, but are not limited to, those that are indirectly affected by surrounding development or agriculture to the extent that hydrology, water quality, or habitat for covered species is adversely affected.

Construction Actions

- Personnel conducting ground-disturbing activities in or adjacent to wetlands and ponds will be trained by a qualified biologist in these avoidance and minimization measures and the permit obligations of project proponents working under this Plan.
- All wetlands and ponds to be avoided by covered activities will be temporarily staked in the field by a qualified biologist to ensure that construction equipment and personnel avoid these features.
- Fencing will be erected along the outer edge of the project area, between the project area and a wetland or pond. The type of fencing will match the activity and impact types. For example, projects that have the potential to cause erosion will require erosion control barriers (see below), and projects that may bring more household pets to a site will be fenced to exclude pets. The temporal requirements for fencing also depend on the activity and impact type. For example, fencing for permanent impacts will be permanent, and fencing for short-term impacts will be removed after the activity is completed.
- Appropriate erosion control measures (e.g., fiber rolls, filter fences, vegetative buffer strips) will be used on site to reduce siltation and runoff of contaminants into wetlands, ponds, streams, or riparian woodland/scrub. Filter fences and mesh will be of material that will not entrap reptiles and amphibians. Erosion control blankets will be used as a last resort because of their tendency to biodegrade slowly and trap reptiles and amphibians.
- Erosion-control measures will be placed between the wetland or pond and the outer edge of the project site.
- Fiber rolls used for erosion control will be certified as free of noxious weed seed.
- Seed mixtures applied for erosion control will not contain invasive nonnative species, but will rather be composed of native species appropriate for the site or sterile nonnative species. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives.

- Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas.
- Trash generated by covered activities will be promptly and properly removed from the site.
- No construction or maintenance vehicles will be refueled within 200 feet of avoided wetlands and ponds unless a bermed and lined refueling area is constructed and hazardous material absorbent pads are available in the event of a spill.
- All management of pest species will be conducted in compliance with the County integrated pest management (IPM) ordinance. In addition, other requirements identified in this chapter that exceed the requirements of the IPM ordinance will be implemented.
- Where appropriate to control serious invasive plants, herbicides that have been approved by EPA for use in or adjacent to aquatic habitats may be used as long as label instructions are followed and applications avoid or minimize impacts on covered species and their habitats. In wetland environments, appropriate herbicides may be applied during the dry season to control nonnative invasive species (e.g., yellow star-thistle). Herbicide drift will be minimized by applying the herbicide as close to the target area as possible. Herbicides will only be applied by certified personnel in accordance with label instructions.
- All organic matter should be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with ponds, wetlands, or potentially contaminated sediments. Items should be rinsed with clean water before leaving each study site (U.S. Fish and Wildlife Service 2005).
- Implement measures to minimize the spread of disease and non-native species based on current Wildlife Agency protocols (e.g., *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog: Appendix B, Recommended Equipment Decontamination Procedures* [U.S. Fish and Wildlife Service 2005]) and other best available science.
- Used cleaning materials (liquids, etc.) should be disposed of safely, and if necessary, taken off site for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags (U.S. Fish and Wildlife Service 2005).
- Portions of the project that occur in streams will comply with Condition 4.

Condition 13. Serpentine and Associated Covered Species Avoidance and Minimization

Serpentine soils comprise four land cover types in the study area: serpentine bunchgrass grassland, serpentine rock outcrops, serpentine seeps, and serpentine chaparral. These land cover types are estimated to encompass 14,314 acres in the study area. Additional unmapped areas of serpentine may be discovered during

implementation because it often occurs in small patches that could not be discerned at the scale of the mapping and available data.

Most of the serpentine areas in the study area are expected to be acquired as part of the Reserve System (see Chapter 5 for specific targets). However, some impacts on these land cover types may still occur (e.g., allowable impacts to serpentine bunchgrass grassland are limited to 550 acres [**Table 4-2]**). Because of the high importance and rarity of serpentine soils and their habitats, these areas will be avoided whenever feasible during project planning.

In cases where serpentine areas are part of a project site in a developed area, the project will be designed to preserve larger patches of serpentine outside the development area and limit impacts to the smallest patches feasible and to the edges of serpentine patches regardless of their size. The length of the edge of the serpentine patch that is directly adjacent to the developed area will be minimized and will include as large a buffer as possible between the serpentine edge and the developed area. Landscaping will not be planted on serpentine areas except as needed to reduce fire hazards adjacent to structures consistent with County fire hazard reduction regulations (see also Condition 10). Plantings will not include species that are known or suspected to invade serpentine habitats or cross-pollinate with endemic serpentine plant species or other native plants.

On undeveloped sites, the project area and construction staging area must be located to avoid or minimize impacts to any serpentine on site. The guidelines described above for developed areas will also be followed for project sites in undeveloped areas.

Where mapped serpentine cannot be avoided, the minimization measures listed below will be implemented.

- Conduct surveys of the serpentine vegetation to inventory for covered species and evaluate habitat quality for covered species.
- For portions of the development area that are in Bay checkerspot butterfly habitat units identified in Appendix D, survey the site for the presence of larval host plants of Bay checkerspot butterfly. If larval host plants are found, conduct reconnaissance level surveys for adult butterflies during the peak of the flight period to determine species presence or absence.
- Locate the project footprint as far from the covered species or the highest-quality serpentine habitat as is feasible. Utilize applicable buffers as identified in this chapter.
- If covered plants occur on the site and cannot be avoided, notify the Implementing Entity of the construction schedule so that plant salvage can be considered and potentially implemented (see Condition 19).

Condition 14. Valley Oak and Blue Oak Woodland Avoidance and Minimization

Valley oak woodland and blue oak woodland are considered by CDFG to be sensitive biotic communities (California Department of Fish and Game 2003). There is evidence that valley oak woodland was once one of the dominant land cover types on the floor of the Santa Clara Valley, but it has been largely removed by urban and agricultural development (San Francisco Estuary Institute 2006, 2008). These communities can provide important foraging or movement habitat for species covered by the Plan—California red-legged frog, and California tiger salamander—as well as for many other native species. For these reasons, these two oak woodland land cover types would benefit from some avoidance and minimization associated with covered activities.

All covered activities will implement the following actions to avoid or minimize impacts on valley and blue oak woodland.

Project Planning

- Projects on sites supporting substantial stands of valley oak woodland or blue oak woodland will minimize their impacts on these communities and preserve these stands on site when to do so would further the biological goals and objectives of the Plan. For example, projects should preserve oak woodland communities that are adjacent to existing stands of protected oak woodlands to avoid habitat fragmentation and degradation of wildlife linkages.
- Projects will avoid to the maximum extent feasible irrigating in and around valley oak woodland and will avoid altering hydrology of the site, including location of septic leach fields, such that valley oak woodland receives more water than under pre-project conditions.
- Large and healthy trees will be maintained on site whenever feasible. Local jurisdictions may set tree size thresholds for preservation that are consistent with local tree ordinances. Large valley oak trees still healthy today are clearly visible on air photos from as far back as 1939 (San Francisco Estuary Institute 2006), even though they are surrounded by agricultural fields or urban development. Preserved trees can provide habitat value for many decades; they also provide a significant community amenity.
- If trees are maintained on a site, buffer zones will be established between preserved valley oak or blue oak trees and development at a distance equal to or greater than the root protection zone, which is defined as a buffer zone determined by calculating one foot for each inch of trunk diameter measured at 4.5 feet above ground surface (Matheny and Clark 1998).

Project Construction

- Temporary project access points will be constructed as close as possible to the work area to minimize necessity for tree removal.
- Roads and pathways will be aligned outside of the tree's root protection zone (as defined above) whenever possible.
- Roads and pathways designed beneath or within 25 feet of the dripline of oak trees will be graded using hand-held equipment and will use permeable surfacing (e.g., grass pavers that allow runoff to infiltrate the ground).
- Alteration of natural grade through fill or other means within the root protection zone of oak trees will be minimized.
- Trenching for utility lines and other purposes will be minimized within root protection zones. Utilities may be installed in these areas by boring below the root zone.
- If extensive pruning of blue oaks and valley oaks is necessary, pruning will be conducted during the winter dormant period for these species and under the supervision of an arborist certified to International Society of Arboriculture or similar standards.

6.6 Conditions to Minimize Impacts on Specific Covered Species

Species-specific conditions are presented below. The timing of species habitat surveys, preconstruction surveys, and construction monitoring relative to impacts are described below and summarized in **Table 6-8**. For long term projects and projects that are phased[18], the frequency and timing of surveys relative to impacts will be determined by the local jurisdiction or Implementing Entity in coordination with the Wildlife Agencies on a case-by-case basis. At a minimum, surveys and monitoring (if required) will be done prior to each construction phase if the entire project area is not continuously disturbed between phases.

The Implementing Entity will maintain and update modeled habitat maps based on guidance provided in Chapter 7, *Monitoring and Adaptive Management Program.* For species that require surveys based on modeled habitat[19], qualified biologists will utilize the most current modeled habitat maps available from the Implementing Entity to guide where surveys must be conducted. Surveys will be conducted based on modeled habitat maps that are updated throughout Plan implementation. Similarly, the Implementing Entity will track impacts to modeled habitat based on modeled habitat maps updated during Plan implementation.

[18] Phasing may include planned phasing of construction (e.g., multi-year phasing of a road construction project), or unplanned gaps in construction activity.
[19] San Joaquin kit fox, western burrowing owl, and Bay checkerspot butterfly.

6.6.1 Selected Covered Wildlife Species

Conditions 15–18 identify conditions on covered activities that are specific to some of the covered species. Activities that may affect these covered species must also adhere to other applicable conditions in this chapter, including Condition 1, *Avoid Direct Impacts on Legally Protected Plant and Wildlife Species*. A summary of species surveys, preconstruction surveys, and construction monitoring requirements is provided in **Table 6-8**.

Condition 15. Western Burrowing Owl

To avoid or minimize direct impacts of covered activities on western burrowing owls, the procedures described below will be implemented. This condition incorporates survey, avoidance, and minimization guidelines from the following western burrowing owl conservation plans and other sources pertaining to the study area. The avoidance and minimization process for western burrowing owl as required in this condition is illustrated in **Figure 6-4**.

- CDFG *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 1995).
- CDFG *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012).
- *Draft Burrowing Owl Habitat Conservation Strategy and Implementation Plan* (City of San José 2000).
- *City of Morgan Hill—Citywide Burrowing Owl Habitat Mitigation Plan* (City of Morgan Hill 2003).
- Personal communication with Jack Barclay regarding ongoing monitoring efforts in the study area including annual monitoring at San José International Airport.
- Various unpublished reports from survey efforts in the study area.
- Guidance from CDFG.

Western Burrowing Owl Habitat Survey

Western burrowing owl habitat surveys will be required in the study area in all modeled occupied nesting habitat (see **Figure 5-11**). Surveys are not required in sites that are mapped as potential burrowing owl nesting or only overwintering habitat. Modeled habitat types may change throughout the permit term based on the best available scientific data. For example, the Implementing Entity will be conducting annual surveys or collecting annual survey data of other organizations in occupied nesting habitat throughout the permitarea to determine the annual status of known nesting areas the number of adult breeding owls present. The Implementing Entity will also coordinate with other South Bay local

governments, special districts, and non-profit organizations every 3 years to assess status of the burrowing owl population in the entire study area and the expanded study area for burrowing owl conservation, outside areas of modeled occupied habitat.

Habitat surveys in occupied nesting habitat are required in both breeding and non-breeding seasons. If the project site falls within occupied nesting habitat, a qualified biologist will map areas with burrows (i.e., areas of highest likelihood of burrowing owl activity) and all burrows that may be occupied (as indicated by tracks, feathers, egg shell fragments, pellets, prey remains, or excrement) on the project site. This mapping will be conducted while walking transects throughout the entire project footprint, plus all accessible areas within a 250-foot radius from the project footprint. The centerline of these transects will be no more than 50 feet apart and will vary in width to account for changes in terrain and vegetation that can preclude complete visual coverage of the area. For example, in hilly terrain with patches of tall grass, transects will be closer together, while in open areas with little vegetation they can be 50 feet apart.

This methodology is consistent with other accepted survey protocols for this species (California Burrowing Owl Consortium 1993). The Implementing Entity may update this protocol during the permit term based on changes to the accepted protocol with the concurrence of the Wildlife Agencies. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas.

If suitable habitat is identified during the habitat survey, and if the project does not fully avoid impacts to the suitable habitat, preconstruction surveys will be required. Suitable habitat is fully avoided if the project footprint does not impinge on a 250-foot buffer around the suitable burrow.

Preconstruction Survey

Prior to any ground disturbance related to covered activities, a qualified biologist will conduct preconstruction surveys in all suitable habitat areas as identified during habitat surveys. The purpose of the preconstruction surveys is to document the presence or absence of burrowing owls on the project site, particularly in areas within 250 feet of construction activity.

To maximize the likelihood of detecting owls, the preconstruction survey will last a minimum of three hours. The survey will begin 1 hour before sunrise and continue until 2 hours after sunrise (3 hours total) or begin 2 hours before sunset and continue until 1 hour after sunset. Additional time may be required for large project sites. A minimum of two surveys will be conducted (if owls are detected on the first survey, a second survey is not needed). All owls observed will be counted and their location will be mapped.

Surveys will conclude no more than 2 calendar days prior to construction. Therefore, the project proponent must begin surveys no more than 4 days prior to

construction (2 days of surveying plus up to 2 days between surveys and construction). To avoid last minute changes in schedule or contracting that may occur if burrowing owls are found, the project proponent may also conduct a preliminary survey up to 14 days before construction. This preliminary survey may count as the first of the two required surveys as long as the second survey concludes no more than 2 calendar days in advance of construction.

Implementation of Covered Activities in Burrowing Owl Habitat

In order to allow covered activities to go forward in burrowing owl habitat prior to the formal take authorization of individuals described above, project applicants will employ avoidance measures described below to ensure that direct take does not occur. Application of these measures is illustrated in **Figure 6-4**. The below avoidance measures apply to all projects that affect any burrowing owl habitat, regardless of whether surveys are required by this condition. In other words, if a project is occurring outside of modeled occupied nesting habitat, the project proponent is obligated to ensure avoidance and minimization of impact to burrowing owls according to the measures described below.

Avoidance Measures

Breeding Season

If evidence of western burrowing owls is found during the breeding season (February 1–August 31), the project proponent will avoid all nest sites that could be disturbed by project construction during the remainder of the breeding season or while the nest is occupied by adults or young (occupation includes individuals or family groups foraging on or near the site following fledging). Avoidance will include establishment of a 250-foot non-disturbance buffer zone around nests. Construction may occur outside of the 250-foot non-disturbance buffer zone. Construction may occur inside of the 250-foot non-disturbance buffer during the breeding season if:

- the nest is not disturbed, and
- the project proponent develops an avoidance, minimization, and monitoring plan that will be reviewed by the Implementing Entity and the Wildlife Agencies prior to project construction based on the following criteria.
  - The Implementing Entity and the Wildlife Agencies approves of the avoidance and minimization plan provided by the project applicant.
  - A qualified biologist monitors the owls for at least 3 days prior to construction to determine baseline nesting and foraging behavior (i.e., behavior without construction).
  - The same qualified biologist monitors the owls during construction and finds no change in owl nesting and foraging behavior in response to construction activities.

- If there is any change in owl nesting and foraging behavior as a result of construction activities, these activities will cease within the 250-foot buffer. Construction cannot resume within the 250-foot buffer until the adults and juveniles from the occupied burrows have moved out of the project site.
- If monitoring indicates that the nest is abandoned prior to the end of nesting season and the burrow is no longer in use by owls, the non-disturbance buffer zone may be removed. The biologist will excavate the burrow to prevent reoccupation after receiving approval from the Wildlife Agencies.

The Implementing Entity and the Wildlife Agencies have 21 calendar days to respond to a request from the project proponent to review the proposed construction monitoring plan. If these parties do not respond within 21 calendar days, it will be presumed that they concur with the proposal and work can commence.

Non-Breeding Season

During the non-breeding season (September 1–January 31), the project proponent will establish a 250-foot non-disturbance buffer around occupied burrows as determined by a qualified biologist. Construction activities outside of this 250-foot buffer are allowed. Construction activities within the non-disturbance buffer are allowed if the following criteria are met in order to prevent owls from abandoning important overwintering sites.

- A qualified biologist monitors the owls for at least 3 days prior to construction to determine baseline foraging behavior (i.e., behavior without construction).
- The same qualified biologist monitors the owls during construction and finds no change in owl foraging behavior in response to construction activities.
- If there is any change in owl nesting and foraging behavior as a result of construction activities, these activities will cease within the 250-foot buffer.
- If the owls are gone for at least one week, the project proponent may request approval from the Implementing Entity that a qualified biologist excavate usable burrows to prevent owls from re-occupying the site. After all usable burrows are excavated, the buffer zone will be removed and construction may continue.

Monitoring must continue as described above for the non-breeding season as long as the burrow remains active.

Construction Monitoring

Based on the avoidance, minimization, and monitoring plan developed (as required in the above section), during construction, the non-disturbance buffer zones will be established and maintained if applicable. A qualified biologist will

monitor the site consistent with the requirements described above to ensure that buffers are enforced and owls are not disturbed. The biological monitor will also conduct training of construction personnel on the avoidance procedures, buffer zones, and protocols in the event that a burrowing owl flies into an active construction zone.

Passive Relocation

Passive relocation would not be allowed under the Plan until the positive growth trend described in Section 5.4.6 is achieved. Once this occurs, passive owl relocation may be allowed, with the approval of the Wildlife Agencies, on project sites in the non-breeding season (September 1–January 31) if the other measures described in this condition do not allow work to continue. Passive relocation would only be proposed if the burrow needed to be removed, or had the potential of collapsing (e.g., from construction activities), as a result of the covered activity.

If passive relocation is eventually allowed, a qualified biologist can passively exclude birds from their burrows during non-breeding season only by installing one-way doors in burrow entrances. These doors will be in place for 48 hours to ensure owls have left the burrow, and then the biologist will excavate the burrow to prevent reoccupation. Burrows will be excavated using hand tools. During excavation an escape route will be maintained at all times. This may include inserting an artificial structure into the burrow to avoid having the overburden collapse into the burrow and trapping owls inside. Other methods of passive relocation, based on best available science, may be approved by the Wildlife Agencies during Plan implementation.

Exceptions to Passive Relocation Prohibition

Due to the relatively low numbers of burrowing owls in the study area, it is not expected that the prohibition of passive relocation will result in project delays. However, it is possible that a covered activity could not proceed due to avoidance measures for burrowing owl in this condition if owls continually persist on a site where avoidance is not feasible. In such cases, a project proponent may apply for an exception based on the following process. For this condition, the term exception means an allowance to conduct passive relocation of burrowing owls during the non-breeding season only when this activity is not otherwise allowed. This exception process is necessary to allow reasonable use and development of a property based on the variety of constraints and factors that may affect the property. In situations where exceptions are granted, other portions of this condition may still apply. Exceptions will be used in a minority of cases with special circumstances that limit or restrict the ability of a landowner to fully apply the condition.

Exceptions may be requested through the standard application process described in Section 6.8, or through a separate request process. Private applicants must apply for a passive relocation exception through their local jurisdiction. Project

proponents must develop and submit with the request for exception a passive relocation plan. The passive relocation plan must document the following.

1. That owls have occupied the site for a full year without relocating voluntarily. Surveys documenting presence must be completed by a qualified biologist and results must be provided in a written report. The report should confirm that one or more individuals (i.e., unique owl[s]) were monitored for a year and that the owl(s) had used the site for a full year[20].
2. The proposed process for relocation, including schedule for the proposed passive relocation and name of the qualified biologist.

The local jurisdiction, the Implementing Entity, and the Wildlife Agencies will meet to discuss the proposed passive relocation plan. Exceptions will be considered based on, but not limited to, the following factors:

1. The parcel is equal to or less than 3 acres and is more than 1,000 feet from other suitable nesting or foraging habitat such that it is unlikely the site can sustain burrowing owls into the future.
2. If the site has historically been used for nesting (within the last 3 years).
3. If the site is a target for a burrowing owl temporary or permanent management agreement.

As part of the review process, the Implementing Entity and Wildlife Agencies will consider the implications of an exception on the burrowing owl population and progress toward the biological goals and objective of the Plan. A passive relocation exception will not be granted if the Implementing Entity and Wildlife Agencies determine that such an exception, as mitigated, would preclude implementation of the conservation strategy of the Habitat Plan or conflict with other applicable requirements of the Habitat Plan and local policies. The local jurisdiction or the Implementing Entity must make written findings that document these considerations and the rationale for the exception.

Additional mitigation may be required as part of an approval to implement passive relocation that is otherwise prohibited by the Plan. The need for and form of additional mitigation will be determined and approved by the Implementing Entity and Wildlife Agencies. Additional mitigation could include payment of additional fees, or contribution of occupied lands to the Reserve System. Applicable fees may be imposed by the local jurisdiction for processing exception requests. Mitigation will be proportional to the impact occurring as a result of a specific eviction and will fully mitigate such evictions.

The Implementing Entity will compile a list of all exceptions granted each calendar year for inclusion in the annual report to the Wildlife Agencies.

[20] If monitoring reveals that an owl(s) has vacated the site for 10 consecutive days or more, the project applicant may assume that the owl has voluntarily relocated and a qualified biologist may take measures to collapse suitable habitat to discourage new owls from occupying the site.

Condition 16. Least Bell's Vireo

To avoid and minimize direct impacts of covered activities on least Bell's vireos, the following procedures will be implemented. These survey requirements provide compliance with the Plan and the MBTA (least Bell's vireo is a listed species, so the HCP permit also serves as a Special Purpose Permit under MBTA; see Chapter 1 for details).

Habitat Survey

Least Bell's vireo surveys will only be required for projects occurring within potential breeding habitat. The Implementing Entity will provide maps showing the geographic regions where surveys may be required. These maps will be updated during the permit term to incorporate best available science on where this species may be found. At the time of Plan adoption, the area of required surveys is limited to the Pajaro watershed, including Uvas, Llagas, and Pacheco sub-watersheds.

Projects occurring within the mapped area require surveys if the project-specific verified land cover map (see Section 6.8.3 *Item 3: Land Cover Types on Site*) shows that the project area is within 250 feet of riparian land cover types. If a project meets this criterion, a qualified biologist will conduct a field investigation to identify and map early successional riparian vegetation (typically dominated by willow shrubs and other thick understory vegetation) which may be used for nesting. If early successional riparian vegetation is found, the project proponent may revise the proposed project to avoid all areas within a 250-foot buffer around the potential nesting habitat and surveys will be concluded.

Preconstruction Survey

If the project proponent chooses not to avoid the potential nesting site and the 250-foot buffer, additional nesting surveys are required. Prior to any ground disturbance related to covered activities, a qualified biologist will:

1. Make his/her best effort to determine if there has been nesting at the site in the past 3 years. This includes checking the CNDDB, contacting local experts, and looking for evidence of historical nesting (i.e., old nests).
2. If no nesting in the past 3 years is evident, conduct a preconstruction survey in areas identified in the habitat survey as supporting potential least Bell's vireo nesting habitat. Surveys will be made at the appropriate times of year when nesting use is expected to occur. The surveys will document the presence or absence of nesting pairs of least Bell's vireo. Protocol-level surveys will be used (USFWS's 2001 least Bell's vireo survey guidelines or latest protocol). Surveys will conclude no more than two calendar days prior to construction.

To avoid last minute changes in schedule or contracting that may occur if an active nest is found, the project proponent may also conduct a preliminary survey up to 14 days before construction. If one or more least Bell's vireo nests are found present (through step 1 or 2 above), the nest site(s) plus a 250-foot buffer will be avoided (see below for additional avoidance and minimization details). The Wildlife Agencies will be notified immediately of nest locations.

Avoidance and Minimization

Covered activities must avoid active least Bell's vireo nests during the breeding season (March 15–July 31) by maintaining at least a 250-foot no-activity buffer around all active nests. As long as the nest remains active, no activity will occur within the established buffer. Disturbance to previous nesting sites (for up to 3 years) will also be avoided during the breeding season unless the disturbance is required for the conservation strategy or to maintain public safety. Least Bell's vireos use previous nesting sites, and disturbance during the breeding season may preclude birds from using existing nests.

The required buffer may be reduced in areas where there are sufficient barriers or topographic relief to protect the nest from excessive noise or other disturbance. Implementing Entity technical staff will coordinate with the Wildlife Agencies and evaluate exceptions to the minimum no-activity buffer distance on a case-by-case basis.

Construction Monitoring

If occupied nests are identified, a qualified biologist will monitor construction to ensure that the 250-foot no-activity buffer around all active least Bell's vireo nests is maintained to ensure that covered activities do not affect nest success. If monitoring indicates that construction outside of the buffer is affecting breeding, the buffer will be increased if space allows (e.g., move staging areas farther away). If space does not allow, construction will cease until the young have fledged from the nest or until the end of the breeding season, whichever occurs first. The biological monitor will also conduct training of construction personnel on the avoidance procedures, buffer zones, and protocols in the event that a least Bell's vireo flies into an active construction zone (i.e., outside the buffer zone).

Condition 17. Tricolored Blackbird

To avoid direct impacts of covered activities on nesting tricolored blackbird colonies, the following procedures will be implemented.

Habitat Survey

Projects require surveys if the project-specific verified land cover map (see Section 6.8.3 *Item 3: Land Cover Types on Site*) shows that the project area is within 250 feet of any riparian, coastal and valley freshwater marsh (perennial wetlands), or pond land cover types. If a project meets this criterion, a qualified biologist will conduct a field investigation to identify and map potential nesting substrate. Nesting substrate generally includes flooded, thorny, or spiny vegetation (e.g., cattails, bulrushes, willows, blackberries, thistles, or nettles). If potential nesting substrate is found, the project proponent may revise the proposed project to avoid all areas within a 250-foot buffer around the potential nesting habitat and surveys will be concluded.

Preconstruction Survey

If the project proponent chooses not to avoid the potential nesting habitat and the 250-foot buffer, additional nesting surveys are required. Prior to any ground disturbance related to covered activities, a qualified biologist will:

1. Make his/her best effort to determine if there has been nesting at the site in the past 5 years. This includes checking the CNDDB, contacting local experts, and looking for evidence of historical nesting (i.e., old nests).
2. If no nesting in the past 5 years is evident, conduct a preconstruction survey in areas identified in the habitat survey as supporting potential tricolored blackbird nesting habitat. Surveys will be made at the appropriate times of year when nesting use is expected to occur. The surveys will document the presence or absence of nesting colonies of tricolored blackbird. Surveys will conclude no more than two calendar days prior to construction.

To avoid last minute changes in schedule or contracting that may occur if an active nest is found, the project proponent may also conduct a preliminary survey up to 14 days before construction. If a tricolored blackbird nesting colony is present (through step 1 or 2 above), a 250-foot buffer will be applied from the outer edge of all hydric vegetation associated with the site and the site plus buffer will be avoided (see below for additional avoidance and minimization details). The Wildlife Agencies will be notified immediately of nest locations.

Avoidance and Minimization

Covered activities must avoid tricolored blackbird nesting habitat that is currently occupied or have been used in the past 5 years. If tricolored blackbird colonies are identified during the breeding season, covered activities will be prohibited within a 250-foot no-activity buffer zone around the outer edge of all hydric vegetation associated with the colony. This buffer may be reduced in areas with dense forest, buildings, or other habitat features between the construction activities and the active nest colony, or where there is sufficient topographic relief to protect the colony from excessive noise or visual disturbance.

Depending on site characteristics, the sensitivity of the colony, and surrounding land uses, the buffer zone may be increased. Land uses potentially affecting a colony will be observed by a qualified biologist to verify that the activity is not disrupting the colony. If it is, the buffer will be increased. Implementing Entity technical staff will coordinate with the Wildlife Agencies and evaluate exceptions to the minimum no-activity buffer distance on a case-by-case basis.

Construction Monitoring

If construction takes place during the breeding season when an active colony is present, a qualified biologist will monitor construction to ensure that the 250-foot buffer zone is enforced. If monitoring indicates that construction outside of the buffer is affecting a breeding colony, the buffer will be increased if space allows (e.g., move staging areas farther away). If space does not allow, construction will cease until the colony abandons the site or until the end of the breeding season, whichever occurs first. The biological monitor will also conduct training of construction personnel on the avoidance procedures, buffer zones, and protocols in the event that tricolored blackbirds fly into an active construction zone (i.e., outside the buffer zone).

Condition 18. San Joaquin Kit Fox

Disturbance of all San Joaquin kit fox dens will be avoided to the maximum extent possible. To avoid or minimize direct impacts of covered activities on San Joaquin kit fox, the following procedures will be implemented. This program was based on USFWS's *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox prior to or during Ground Disturbance* (U.S. Fish and Wildlife Service 2011).

Habitat Survey

San Joaquin kit fox surveys will only be required for projects occurring within modeled habitat (**Appendix D**). (This model will be updated as needed based on best available scientific information.) The Implementing Entity will provide updated modeled habitat maps to the County (the only jurisdiction in which these areas occur). A qualified biologist will conduct a field evaluation of suitable breeding or denning habitat for kit fox for all covered activities that occur within modeled habitat and map potential den sites. If the project does not fully avoid impacts on suitable dens, preconstruction surveys will be required. Suitable breeding habitat is fully avoided if the project footprint does not overlap with a suitable den or with a 250-foot buffer around the suitable den.

Preconstruction Survey

Prior to any ground disturbance related to covered activities, a qualified biologist will conduct a preconstruction survey for covered activities in areas identified by species surveys as being suitable breeding or denning habitat. The surveys will evaluate use of dens by kit foxes using methods appropriate for the northern edge of the species' range, such as placing a tracking medium in the project area where suitable dens occur. Surveys will conclude no more than two calendar days prior to construction. To avoid last minute changes in schedule or contracting that may occur if a kit fox or active den is found, the project proponent may also conduct a preliminary survey up to 14 days before construction. On the parcel where the activity is proposed, the biologist will survey the proposed disturbance footprint and a 250-foot radius from the perimeter of the proposed footprint to identify San Joaquin kit foxes and/or suitable dens. Adjacent parcels under different land ownership will not be surveyed unless access is granted within the 250-foot radius. The status of all dens will be determined and mapped. Written results of preconstruction surveys will be submitted to USFWS and CDFG within two calendar days after survey completion and before the start of ground disturbance.

If San Joaquin kit foxes and/or suitable dens (i.e., dens greater than 5 inches in diameter) are identified in the survey area, the conditions described below will be implemented.

Avoidance and Minimization

The goal of the avoidance and minimization measures for San Joaquin kit fox are to avoid all injury or death to kit fox in the study area, and to minimize harm or harassment to the species. No take authorization for injury or death to kit fox is provided by this Plan due to the rarity of the species in the study area. The following avoidance and minimization conditions will be applied to projects that do not fully avoid suitable dens or kit fox individuals.

- If a suitable San Joaquin kit fox den is discovered in the proposed development footprint, the den will be monitored for 3 days by a USFWS- and CDFG-approved biologist using a tracking medium or an infrared beam camera to determine if the den is currently being used.
- Unoccupied dens will be destroyed immediately to prevent subsequent use.
- If a natal or pupping den is found, USFWS and CDFG will be notified immediately. The den will not be destroyed until the pups and adults have vacated and then only after further consultation with USFWS and CDFG.
- If kit fox activity is observed at the den during the initial monitoring period, the den will be monitored for an additional 5 consecutive days from the time of the first observation to allow any resident animals to move to another den while den use is actively discouraged. For dens other than natal or pupping dens, use of the den can be discouraged by partially plugging the entrance with soil such that any resident animal can easily escape. Once the den is

determined to be unoccupied it may be excavated under the direction of the biologist. Alternatively, if the animal is still present after 5 or more consecutive days of plugging and monitoring, the den may have to be excavated by hand when, in the judgment of a biologist, it is temporarily vacant (i.e., during the animal's normal foraging activities). If at any point during excavation a kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring of the den as described above will be resumed. Destruction of the den may be completed when, in the judgment of the biologist, the animal has escaped from the partially destroyed den.

- Construction and on-going operational requirements from *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox prior to or during Ground Disturbance* (U.S. Fish and Wildlife Service 2011) or the latest guidelines will be implemented.
- If active or suitable dens are identified within the proposed disturbance footprint or outside the proposed project footprint but within a 250-foot buffer, exclusion zones around each den entrance or cluster of entrances will be demarcated. The configuration of exclusion zones will be circular, with a radius measured outward from the den entrance(s). No covered activities will occur within the exclusion zones. Exclusion zone radii for atypical dens and suitable dens will be at least 50 feet and will be demarcated with four to five flagged stakes. Exclusion zone radii for known dens will be at least 100 feet and will be demarcated with staking and flagging that encircles each den or cluster of dens but does not prevent access to the den by the foxes.

Construction Monitoring

If construction takes place while kit fox dens are occupied, a qualified biologist will be present to ensure compliance with the avoidance and minimization measures listed above. The frequency of monitoring will be approved by USFWS and CDFG and will be based on the frequency and intensity of construction activities and the likelihood of disturbance to the active dens. In most cases, monitoring will occur at least weekly, but in some cases daily monitoring may be appropriate to ensure that disturbance of San Joaquin kit fox is minimized.

6.6.2 Covered Plant Species

Impacts on covered plant occurrences are constrained by limits on the number of occurrences impacted, as described in Chapter 4 (see **Table 4-6**). Accordingly, only two additional conditions on covered activities is needed to meet regulatory requirements for covered plants.

Condition 19. Plant Salvage when Impacts are Unavoidable

Where impacts on covered plant species cannot be avoided and plants will be removed by approved covered activities, the Implementing Entity has the option of salvaging the covered plants. Salvage of covered plants is conducted in addition to mitigation that may be required for impacts on covered plants.

Plant salvage as mitigation is acknowledged as a technique that rarely succeeds; it is opposed by conservation organizations as a primary mitigation tool (Howald 1996; California Native Plant Society 1998). Therefore, the Implementing Entity must carefully weigh the expected costs and potential benefits of the salvage effort before undertaking it. Salvage guidelines are presented below for all covered plants, for perennial species, and for annual species.

All Covered Plants

All salvage operations will be conducted by the Implementing Entity or a third party contractor approved by the Implementing Entity. Translocation activities will be reviewed and approved by the Wildlife Agencies in advance of translocation activities occurring. Translocated plants should be moved during their dormant season in order to minimize impacts to individuals. To ensure enough time to plan salvage operations, project proponents will notify the Implementing Entity of their schedule for removing the covered plant occurrence.

The Implementing Entity may conduct investigations into the efficacy of salvaging seeds from the soil seed bank for both perennial and annual species. The soil seed bank may add to the genetic variability of the occurrence. Covered species may be separated from the soil though garden/greenhouse germination or other appropriate means. Some topsoil taken from impact sites may also be moved to the transplant site in the reserve to introduce soil microorganisms.

The Implementing Entity will transplant new occurrences such that they constitute separate populations and do not become part of an existing population of the species, as measured by the potential for genetic exchange among individuals through pollen or propagule (e.g., seed, fruit) dispersal. Transplanting or seeding *receptor* sites (i.e., habitat suitable for establishing a new population) will be carefully selected on the basis of physical, biological, and logistical considerations (Fiedler and Laven 1996); some examples of these are listed below.

- Historic range of the species.
- Soil type.
- Soil moisture.
- Topographic position, including slope and aspect.

- Site hydrology.
- Mycorrhizal associates.
- Presence or absence of typical associated plant species.
- Presence or absence of herbivores or plant competitors.
- Site accessibility for establishment, monitoring, and protection from trampling by cattle or trail users.

Perennial Covered Plants

Salvage methods for perennial species will be tested for whole individuals, cuttings, and seeds. Salvage measures will include the evaluation of techniques for transplanting as well as germinating seed in garden or greenhouse and then transplanting to suitable habitat sites in the field. Techniques will be tested for each species, and appropriate methods will be identified through research and adaptive management. Where plants are transplanted or seeds distributed to the field, they will be located in reserves in suitable habitat to establish new populations. Field trials will be conducted to evaluate the efficacy of different methods and determine the best methods to establish new populations. Transplanting within the reserves will only minimally disturb existing native vegetation and soils. Supplemental watering may be provided as necessary to increase the chances of successful establishment, but must be removed following initial population establishment. Supplemental watering will include watering throughout first growing season to mimic natural rainfall patterns. During establishment, areas will be fenced off as necessary to prevent trampling or grazing by livestock. These areas will not be selected for controlled burns. Once the population has established itself, as determined by success criteria that may include setting seed, 3-year survival, or other criteria developed in agreement with the Wildlife Agencies, then fencing and irrigation will be removed and the site may be burned for management purposes if that is appropriate for the target plant.

Annual Covered Plants

For annual covered plants, mature seeds will be collected from all individuals for which impacts cannot be avoided (or if the population is large, a representative sample of individuals). If storage is necessary, seed storage studies will be conducted to determine the best storage techniques for each species. A seed storage facility will also be contacted and consulted regarding collecting and storage requirements of the facility. One of the leading seed banks in California is the Rancho Santa Ana Botanic Garden in Claremont, CA (Rancho Santa Ana Botanic Garden 2010). This facility has strict seed collection and storage guidelines available on its website (http://www.rsabg.org).

If needed, studies will be conducted on seeds germinated and plants grown to maturity in garden or greenhouse to propagate larger numbers of seed. Such

studies can be contracted with research institutions such as the Rancho Santa Ana Botanic Garden, or carried out by other qualified biologists. Seed propagation methods will ensure that genetic variation is not substantially affected by propagation (i.e., selection for plants best adapted to cultivated conditions). Field studies will be conducted under the Adaptive Management Program to determine the efficacy and best approach for dispersal of seed into suitable habitat. Where seeds are distributed to the field, they will be located in reserves in suitable habitat to establish new populations. If seed collection methods fail (e.g., due to excessive seed predation by insects), alternative propagation techniques will be necessary.

Condition 20. Avoid and Minimize Impacts to Covered Plant Occurrences

Almost all known occurrences of covered plants in the study area are outside the planning limits of urban growth and outside the footprint of covered activities. Many of these occurrences are expected to be included in the Reserve System. However, uncertainty remains regarding impacts on covered plants because of the lack of surveys in many areas, the general nature of some plant occurrence data, and the uncertainty in the location of some covered activities. To account for this uncertainty, impacts on covered plants are tracked by occurrence[21], as described in Chapter 4. To ensure compliance with the requirements in Chapter 5, surveys for covered plants will be conducted in certain areas in order to 1) identify occurrences of covered plants, and 2) assess the condition of these occurrences.

Covered Plant Surveys

To ensure that plants are adequately conserved relative to impacts of covered activities, plant surveys will identify occurrences of covered plants that may be affected by covered activities (see Section 5.3.1 *Land Acquisition and Restoration Actions* subheading *Incorporating Covered Plant Species*). Surveys are required in locations where covered plant occurrences are most likely to occur. Covered plant surveys will be required in the following land cover types and specific habitats. The plant species for which surveys are required are also indicated. These land cover types and habitats were identified because the majority of covered species occur primarily or exclusively in serpentine land cover types.

- Serpentine bunchgrass grassland: Survey for smooth lessingia, fragrant fritillary, Metcalf canyon jewelflower, most beautiful jewelflower, Tiburon paintbrush, and Coyote ceanothus.

[21] Occurrence can be synonymous with population for some species. However, some plant species may have several occurrences in one population. Definitions of plant populations will be developed for covered plants during implementation.

- Serpentine rock outcrop: Survey for Santa Clara Valley dudleya, smooth lessingia, Metcalf canyon jewelflower, most beautiful jewelflower, and Tiburon paintbrush.
- Serpentine seep: Survey for Mount Hamilton thistle.
- Mixed serpentine chaparral: Survey for Coyote ceanothus and most beautiful jewelflower.
- Mixed oak woodland and forest with serpentine soils: Survey for Loma Prieta hoita.
- Coast live oak forest and woodland with serpentine soils: Survey for Loma Prieta hoita.
- Northern coastal scrub and Diablan sage scrub with serpentine soils: Survey for Coyote ceanothus, Metcalf canyon jewelflower, most beautiful jewelflower, and smooth lessingia.

Plant surveys will also be required in suitable habitat within a 0.25 mile (1,320 feet) radius of a known occurrence of a covered plant to ensure that known occurrences are located (in most cases, these survey areas will overlap with the land cover types listed above). The Implementing Entity will maintain a map of known occurrences and the survey radius around each one based on this Plan and updates provided by the CNDDB (every six months) for the study area.

These surveys will be performed according to the current applicable guidelines of CDFG and/or USFWS for plant surveys (if available) except no floristic surveys are required. The appropriate survey period for each covered plant species is described in **Table 6-9**[22]. Surveys must be conducted at the time of year when the species can be identified in the field. In some cases, plants may be identifiable outside of the flowering period (e.g., Mount Hamilton thistle, Coyote ceanothus).

Inside the urban service area, surveys for covered plants will occur in land cover types and habitats listed above within the area on which the land cover fee will be levied and in any other areas where indirect effects could occur. The survey area must include buffers around structure where required vegetation clearing will occur to meet state and local fuel reduction regulations.

If a covered plant occurrence is observed on site, the condition of this occurrence must be described in the application package according to the guidelines in Chapter 5, Section 5.3.1 *Land Acquisition and Restoration Activities* subheading *Incorporating Covered Plant Species*. The condition of each covered plant occurrence must be documented as a baseline to compare future monitoring (if necessary) and to ensure that occurrences are protected within the Reserve System that are in as good or better condition than those lost to covered activities.

[22] These survey periods should be used as a guide only. Some plants can be readily identified by qualified botanists outside of the species' blooming period.

If a covered plant occurrence is found on the project site, the local jurisdiction will obtain the opinion of a qualified biologist regarding the projected long-term viability of a covered plant occurrence given the plant occurrence condition, site conditions, and project-level construction details. The qualified biologist will make this determination based on best available scientific information. In cases where it is difficult to project long-term viability, the qualified biologist will conservatively error in favor of the covered plant and assume that long-term viability will be reduced and the occurrence will be considered lost for tracking purposes. Impacts to covered plants will be avoided or minimized wherever possible by implementing the following conditions.

Avoidance and Minimization

In order to reduce impacts to covered plants, all covered activities will be confined to the minimum area necessary to complete the activity or construction. A setback buffer will be established around covered plant occurrences located on any project site or in an adjacent area that could be affected by construction traffic or activities. The setback buffer will be adequate to prevent or minimize impacts during or after project implementation. The plants and buffer area will be protected from encroachment and damage during construction by installing temporary construction fencing. Fencing will be bright-colored and highly visible. Fencing will be designed to keep construction equipment away from plants and prevent unnecessary damage to or loss of plants on the project site. Fencing will be installed under the supervision of a qualified biologist to ensure proper location and prevent damage to plants during installation. Fencing will be installed before any site preparation or construction work begins and will remain in place for the duration of construction. Construction personnel will be prohibited from entering these areas (the exclusion zone) for the duration of project construction.

Site Monitoring, Assessment, and Management

If a qualified biologist determines that the long-term viability of a covered plant occurrence will be reduced (as described below) by implementation of covered activities, the loss must be offset by protection, management, and monitoring of covered plant occurrences in the Reserve System prior to impacts (**Table 5-16**).

Some covered plant occurrences may only be disturbed or partially affected by covered activities, and viability may be maintained. It is important to monitor and, if possible, maintain these occurrences of covered plants where they occur, even if they are not protected within the Reserve System. Covered plant occurrences that are determined to be partially permanently affected by a qualified biologist (i.e., only a portion of the occurrence is impacted) by covered activities will be monitored by the Implementing Entity. The purpose of the monitoring will be 1) to assess whether the impact reduces the long-term viability of the occurrence and whether supplemental management actions are feasible and warranted, and 2) to determine whether the Implementing Entity must protect and

enhance or create[23] occurrences in the Reserve System according to **Table 5-16**. If the impact occurs to less than 5% of the total occurrence as measured by the number of individuals at the time of impact, then the impact is assumed not to affect long-term viability and will not require monitoring nor will it count as a permanent impact (**Table 4-6**). This allowance does not apply to Coyote ceanothus.

When determining viability for the purpose of assessing a partial or permanent impact, the Implementing Entity will consider the following factors.

1. Results of monitoring plant occurrences affected by covered activities (e.g., correlation between pre-project observations and actual viability post-project).
2. Impacts to date to the covered plant species and how close total impacts are to the allowable impact cap in the Plan (e.g., extra care taken when near cap not to exceed the cap).

Specific monitoring protocols and success criteria will be developed during implementation as appropriate for each covered species, according to the guidelines discussed here. Monitoring protocols can draw on those developed for other HCP/NCCPs. It is possible that only a portion of the occurrence will be located on the covered activity project site. In such instances, the monitoring protocol will address this issue. Three possible approaches include the following.

1. If the landowner agrees, the Implementing Entity will obtain access to the adjacent sites on which the rest of the plant occurrence is located, and surveys will include the entire occurrence.
2. If access to adjacent site(s) is not possible, or if for some other reason it is not feasible to survey the entire occurrence, then an alternative will be developed to estimate the extent and condition of the adjacent portion of the occurrence.
3. If only a small portion of the occurrence is on adjacent properties, then only the portion of the occurrence on the project site will be monitored and assessed for viability. The determination whether this is a full impact will be made based on the results for this portion of the occurrence only.

Population monitoring will be conducted by the Implementing Entity before the covered activity is implemented to document the baseline condition. For annual species, the minimum post-construction monitoring period will be 5 years. If extreme or unusual climate conditions affect the species, then monitoring will be extended 1 or 2 years, as appropriate to assess impacts and success. Monitoring will include estimates of percent cover and number of individuals. An occurrence will be assumed to retain long-term viability and will not require replacement in the Reserve System if the decline in occurrence size and percent cover from pre-project conditions is less than 25% over the monitoring period,

[23] Creation is only allowed to mitigate effects for Coyote ceanothus. All other plant occurrence creation would contribute to recovery (**Table 5-16**).

unless site-specific conditions otherwise suggest substantial declines in occurrence viability.

For perennial species, the minimum post-construction monitoring period will be 3 years. Monitoring will include estimates of density (percent cover), recruitment of seedlings if impacts included removing individuals, and measurements of adult plant health (e.g., signs of disease, herbivory, nutrient deficiencies, etc.). An occurrence of a perennial covered species will be assumed to retain long-term viability and will not require replacement in the reserve system if the decline in seedling recruitment and density from pre-project conditions is less than 25% over the monitoring period, unless site-specific conditions otherwise suggest substantial declines in occurrence viability.

The Implementing Entity will implement conservation actions on the site that would help to maintain or improve the condition of the occurrence, as long as an agreement can be reached with the landowner to conduct these measures. Possible conservation measures are described in Chapter 5. If plant occurrences are determined to not be viable based on post-project monitoring, the Implementing Entity must assess the loss as a full permanent impact and implement conservation actions accordingly. In these cases, mitigation would occur after the impact. However, the potential for mitigation to occur after impacts is unlikely given that the qualified biologist and Implementing Entity will make conservative determinations regarding projected impacts on long-term viability.

6.7 Receiving Take Authorization under the Plan

Take authorization will be provided by the Plan to three broad categories of covered activities: public projects proposed by the Permittees, private projects under the jurisdiction of the Permittees, and public projects by non-Permittees in the study area that are approved for inclusion by the Implementing Entity. Each of these situations is explained below.

6.7.1 Evaluation Process for Permittee Projects

The Plan permits provide the Permittees with take authorization along with the authority to approve covered activities complying with the terms of the Plan. If a Permittee undertakes a covered activity (see Chapter 2), the Permittee must document compliance with the Habitat Plan and provide a copy of this documentation to the Implementing Entity for tracking purposes (i.e., to track the amount of take coverage granted) before the Permittee take authorization may be used. As described in Chapter 8, the Permittees will develop a template Habitat Plan application package for use by private applicants and Permittees that includes all items described in this section prior to permit issuance. It is expected that the documentation will be similar to the *Habitat Plan application package*

required of private project proponents[24] applying to local jurisdictions for coverage (this application package is described in detail in Section 6.8 *Habitat Plan Application Package*, below).

Review and CEQA for Permittee Projects

Many covered activities are expected to be subject to CEQA[25]. When Permittees initiate projects that are also subject to CEQA, the terms of the Habitat Plan should generally be integrated into the CEQA environmental review process. To facilitate CEQA coordination, the Permittee should begin preparation of the Habitat Plan application package (or equivalent material) when the CEQA project description and alternatives for the project are developed such that requirements of the Habitat Plan can be used to inform site design and selection of the preferred alternative. The completed Habitat Plan documentation should be evaluated and approved by the appropriate CEQA lead agency of the Permittee concurrently with the lead agency's review of the associated CEQA documents. Projects exempt from CEQA may still be covered activities under this Plan and require compliance with the conditions of this Plan as described in this chapter.

Receiving Take Authorization for Permittee Projects

Incidental take associated with covered activities carried out by the Permittees is authorized under the permits issued for the Habitat Plan. These projects are therefore "pre-approved" for take authorization by the Wildlife Agencies as long as their effects were adequately analyzed, they meet the conditions of the Plan, and they pay the appropriate fees, if applicable. Each Permittee is responsible for ensuring that its covered activity is compliant with the conditions of approval described in this chapter. Take authorization will be in effect once the Permittee documents consistency with the Habitat Plan. The form developed by the Implementing Entity to document the consistency of private development with the Plan may also be used by Permittees for their own projects. Documentation of Plan consistency and a complete Habitat Plan application package must be submitted to the Implementing Entity for tracking purposes. The process for receiving take authorization under the Plan for public projects of the Permittees is shown in **Figure 6-5**.

[24] The term *project proponent* is used interchangeably with the term *applicant* or *project applicant* in this and subsequent chapters.

[25] Permittee covered activities that may not be subject to CEQA include operations and maintenance activities and projects that only require ministerial approval within local jurisdictions such as single family home construction.

6.7.2 Application Process for Private Projects

Private applicants seeking coverage under the Habitat Plan, including applicants that wish to opt in to the Plan[26], will apply to their local jurisdiction by submitting a *Habitat Plan application package* described in Section 6.8 *Habitat Plan Application Package*. A checklist for evaluating these applications will be developed by the Implementing Entity prior to the first ordinance implementing the Plan taking effect. The local jurisdiction will review the Habitat Plan application package for completeness in accordance with the checklist. For requests to opt in, the local jurisdiction will also evaluate the amount of take requested (i.e., acres of impacts) and whether or not take coverage is available for the project. If the application package is not complete, it will be returned to the project proponent with an explanation of why it is incomplete. If the application package is complete, the local jurisdiction will calculate the required fees on the basis of the requirements described in Chapter 9 and consistent with the local ordinance implementing the Plan. The determination of completeness of the application package rests with the local jurisdiction. If they choose, local jurisdictions may request technical assistance from the Implementing Entity staff in their review.

All applicable conditions will be identified and fees paid at (or before) the time of issuance of the first authorization of ground disturbance (typically a grading permit or building permit). In cases where there is no grading or other ground disturbance permit, the fees will be due upon issuance of the first permit that authorizes construction. If the project proponent requests to contribute land in lieu of fees or requests special project conditions, such requests must be reviewed and approved by the Implementing Entity. See Chapter 8, Section 8.2.1 *Permittees* for Permittees that may grant take authorization and Section 8.7 *Roles and responsibilities in Reviewing Applications for Take Authorization* for additional detail on application review.

The process for receiving take authorization for private projects is shown in **Figure 6-6**. Local agencies reviewing the Plan application package will be subject to the processing time and other requirements of the Permit Streamlining Act (Section 65920 et seq.) which requires public agencies to follow standardized time limits and procedures when making specific types of land use decisions.

Application Review and CEQA for Private Projects

Many private covered activities will require a land use approval and be subject to CEQA. For such covered activities, review of applications for take authorization should generally be undertaken concurrently with the CEQA environmental review. To facilitate this approach, the local jurisdiction should generally request

[26] Private parties that are not subject to the Plan (see **Figure 2-5**) have the option to request coverage under the Plan from the applicable local jurisdiction.

that project proponents submit initial Habitat Plan application package information as part of the land use approval application and CEQA process.

There are many benefits to drafting the Habitat Plan application early in the planning process. First, submitting initial Plan application package information during the land use approval / CEQA process will illustrate the various requirements of the Habitat Plan on the proposed project, and provide time for the project proponent to change the project description or to identify alternatives for CEQA analysis. Second, it will enable the CEQA document to refer to the project-specific requirements as identified in the draft Plan application. Finally, it will enable the local jurisdiction to provide early review of the Plan application for completeness. Based on a review of this initial information and a determination of the Habitat Plan requirements, the local jurisdiction can establish conditions of approval specifying the Habitat Plan conditions and fee requirements. Habitat Plan fees will need to be paid prior to the issuance of construction permits (grading / building permits).

Each local jurisdiction is responsible for ensuring that covered activities, upon issuance of take, fully comply with the terms of the Habitat Plan.

Granting Take Authorization for Private Projects

Proponents of private projects that are covered by the Plan and not exempt (see Section 6.2 *Exemptions from Conditions*) must have their projects conditioned by the local jurisdiction obligating compliance with all terms and conditions of the Implementing Agreement, the Plan, and the state and federal permits that apply to the project prior to the local jurisdiction issuing take authorization. Such terms and conditions include, but are not limited to, those listed below.

- Compliance with all relevant avoidance, minimization, surveys, monitoring, and conservation measures determined by the local jurisdiction to apply to the project as required by the Plan.
- The right for the Permittee to monitor the applicant's compliance with all applicable conditions of this Plan.
- Imposition of a fee or dedication of land in lieu of the fee as described in Chapter 9 and in the local Implementing Ordinance.

Before take authorization is granted, Permittees must prepare a written determination of the project's consistency with the Plan. A template form for private applicants that documents this determination of consistency will be developed by the Implementing Entity prior to the first local ordinance taking effect (this consistency determination will be made based on the application checklist described above).

Once the Habitat Plan application package is deemed complete, the conditions of approval have been established and imposed, and the required fees (if applicable) have been paid, the project proponent will be granted take authorization by the

appropriate Permittee (see Chapter 9 for required fees and payment times). At this point, the project proponent will be allowed to proceed with the project consistent with other applicable local, state, and federal laws and local entitlements. Take authorization for impacts on covered species will be provided by the applicable Permittee consistent with the state and federal permits issued to all Permittees. Each local jurisdiction, working with the Implementing Entity will develop a process to document projects that receive take authorization but do not proceed with the project to have the take authorization removed from the Implementing Entity's records.

When Habitat Plan application packages are completed, each Permittee must provide a copy of the application material to the Implementing Entity for entry into the Habitat Plan database (described in Chapter 8 *Plan Implementation*).

6.7.3 Application Process for Non-Permittee Public Projects

Because the list and evaluation of covered activities in Chapter 2 is meant to be comprehensive, the Plan has included some projects that will be proposed by public entities that are not Permittees. For example, a special district or local school district may propose to build a project in one of the three participating cities or the unincorporated County. Although the special district or school district is not subject to the land use jurisdiction of the participating jurisdictions, the impacts of its project have been covered by the Plan and evaluated as part of the planned urban development within the jurisdiction. To receive coverage under the Plan, projects proposed by an entity that is neither a Permittee nor subject to the land use authority of a Permittee, the project proponent must apply directly to the Implementing Entity as a *Participating Special Entity*. The entity will provide the same Habitat Plan application package as private entities seeking coverage. See Chapter 8, Section 8.4 *Participating Special Entities*, for more details on the process by which Participating Special Entities receive take authorization under the Plan.

6.8 Habitat Plan Application Package

Private projects that are covered by the Plan must submit a *Habitat Plan application package* to the local jurisdiction for review and approval in order to receive coverage under the Habitat Plan. For their own projects, Permittees must submit an application package to the Implementing Entity for tracking purposes and pay the appropriate fees if applicable. The project proponent is responsible for preparing the application package and paying for any necessary field surveys, if required. The application package must contain the following items, if applicable, each of which is described in detail in this section.

- Item 1: An application form for coverage under the Plan.

- Item 2: A brief description and map of the project.
- Item 3: Documentation of land cover types on site.
- Item 4: Map of wetlands and waters, if applicable.
- Item 5: Results of applicable surveys for selected covered species.
- Item 6: Documentation of any additional and applicable avoidance and minimization requirements that will be implemented.

Each item in the application package builds on the previous item. For example, surveys for certain covered wildlife and plants (Item 5) are required only if specific land cover types are documented on the site (Items 3 and 4). Many covered activities will be able to comply with the Habitat Plan by only completing Items 1, 2, and 3 of the application package. For others, field surveys are limited to only the highest-value biological resources.

Most components of the application package can be prepared by the applicant, with the assistance of local planning staff. In some cases, the Plan requires that components be prepared or surveys or monitoring be conducted by *qualified biologist*. Please see *Qualified Biologists* below for details on the qualification process.

Templates for all these application components will be provided by the Implementing Entity to each local jurisdiction prior to the first local ordinance taking effect. These templates will also be posted on the Habitat Plan web site for use by private applicants and their consultants. Use of the templates will streamline the review and approval process by local jurisdictions. The Permittees may adjust the required components of the application package over time, consistent with the requirements of the Plan. To recover the costs of reviewing and processing these application packages, local jurisdictions may charge a fee associated with the application (see Chapter 9 for details).

The Habitat Plan application package, survey requirements, and conditions of approval were designed with the following principles in mind.

- Provide the necessary data to track impacts of all covered activities to allow the Implementing Entity to meet Plan requirements (e.g., land acquisition, Stay-Ahead provisions, wetland restoration).
- Simplify and reduce pre-project survey requirements relative to current and future environmental regulations throughout the Habitat Plan.
- Avoid and minimize impacts on covered species and natural land cover types to the maximum extent practicable on a regional scale, in compliance with federal and state endangered species laws.
- Ensure that survey requirements are proportional to impacts—the survey burden is lower on low-quality habitat than on high-quality habitat.
- When possible, limit survey requirements under the Plan to those required for other local, state, or federal environmental compliance (e.g., CEQA or

NEPA), and redirect resources previously spent on biological surveys to improve regional conservation.

Each of the required application components is described below.

6.8.1 Item 1: Project Application Form

The project application form will contain basic information about the project. The Implementing Entity will develop a form prior to issuance of the state and federal Plan permits that will be made available to the Permittees. Required forms will be available through the local jurisdictions and on the Habitat Plan website.

6.8.2 Item 2: Project Description and Map

The application package will include a brief project description including the location, assessor's parcel number, construction activity or maintenance methods, a description of the nature of the impacts (permanent or temporary), and timing (including duration) of the project or activity. The project description will be sufficient to document that it is a covered activity in the Plan (see Chapter 2). A legible vicinity map of the project site will also be provided to document that the project is within the Habitat Plan study area. A vicinity map will include any streams or water bodies that fall within the mapped area. If the project is located in Fee Zone A or B, but the project applicant believes that the project qualifies for Fee Zone C, the project applicant must demonstrate compliance with the criteria provided in Chapter 9, Section 9.4.1 *Habitat Plan Development Fees*, subheading *Land Cover Fee Zones*. A project detail map will be included that shows the area on which fees will be levied, as well as the full project parcel if inside the urban service area or the full development area if outside the urban service area, and any relevant landforms, roads, water bodies, and existing and proposed structures that will be affected by the proposed project.

6.8.3 Item 3: Land Cover Types on Site

As described in Chapter 3 *Physical and Biological Resources* a detailed land cover map was developed for the study area for this Plan. This land cover map was essential in estimating impacts of the covered activities (Chapter 4) and developing the conservation strategy (Chapter 5). However, due to limitations in the land cover mapping (see **Table 3-4**) and the potential for land cover to change over time, land cover types must be verified at the time applications are submitted. This step is also critical because almost all impacts under the Plan are tracked by land cover type.

Proponents of all projects and activities with quantifiable impacts, including approved Participating Special Entities, will specify the amount and type of land cover that will be permanently and temporarily impacted. All fees are paid on the development area (see **Figure 6-1**) except for land inside the urban service area designated with a land use of Urban Development or Rural Residential (see **Figure 2-2**) that is less than 10 acres, where fees are assessed on the parcel. In addition, all public corridor projects (e.g., stream and utility) pay fees based on the project footprint, regardless of parcel size. As described in Condition 12, projects that do not completely avoid indirect effects to wetlands (including wetlands on parcels adjacent to the covered activity development area) will be considered permanently impacted and will count towards the impact caps described in **Table 4-2** and will be assessed fees as described in Chapter 9.

Project proponents of activities that have temporary impacts are required to provide photographs that document the condition of the project site before the activity is implemented. These photographs will be compared to those required for post-project conditions (see Item 6) to determine if impacts were temporary and that appropriate fees were paid.

All calculations and other information provided in application packages will be verified by the local jurisdiction or Implementing Entity so that all impacts to land cover types can be tracked appropriately and fees paid. This exercise can be performed through air-photo analysis or field verification. Project proponents may request assistance from local planning staff in this analysis (for exempt projects, local jurisdictions will document land cover types present). For sites outside urban or suburban areas that support natural land cover types, land cover verification may need to be performed by a qualified biologist. Land cover type classification will be done in accordance with the descriptions provided in Section 3.3.5 *Natural Communities and Land Cover Types*. If the project site supports or may support any wetland or stream land cover types that would be affected by the proposed project, a qualified biologist must be retained (see Item 4 below).

All land cover determinations provided by private applicants will be verified by local planning staff. All land cover determinations provided by a Permittee will be verified by Implementing Entity staff. A private applicant or Permittee may retain Implementing Entity staff (at cost) to conduct this land cover mapping. Local jurisdiction staff may also be available to provide this service to private applicants as part of the application review process.

Land cover mapping of sites with the following land cover types, as mapped by the Plan, can be conducted by the applicant or local planning staff.

- California annual grassland[27];
- reservoirs;

[27] See definition of annual grassland in Chapter 3. When trees are present in annual grassland at low density, the land cover may instead be oak woodland. In these cases, a qualified professional is needed to make the determination.

- all agricultural land cover types; and
- all development land cover types.

Additions to existing development encompassing an area of 10,000 square feet (approximately 0.2 acre) or less on any land cover type, other than stream, riparian, serpentine, pond, or wetland land cover types, do not require land cover mapping by a qualified biologist or other professional. These projects may be mapped based on aerial photos by planners or applicants.

All other land cover types must be mapped by a qualified biologist. Forest land cover types can also be mapped by a professional forester or arborist. Accurate mapping of the remaining land cover types is necessary because of the Implementing Entity's obligation to stay ahead of impacts by land cover type and to ensure the appropriate species surveys are conducted. The Implementing Entity will provide a list of qualified biologists to conduct land cover mapping and other surveys required by the Habitat Plan. The Implementing Entity may also provide a list of qualified professionals (e.g., non-biologists such as foresters and arborists) to conduct land cover mapping. Biologists and other professionals qualified to conduct land cover mapping will have demonstrated experience conducting vegetation mapping in the field or from air photos at the scale of the proposed project and in vegetation types similar to those on the project site. This list will be updated regularly and made available to project proponents and the Permittees. Biologists conducting species surveys that could result in take must also be pre-approved by USFWS and CDFG (see Item 5 below).

Land cover mapping is not required for operations and maintenance activities conducted by Permittees except where serpentine land cover will be impacted (land cover mapping is required for all private applicants and Participating Special Entity projects). However, Permittees must still implement all applicable conditions including plant surveys. As such, some projects with operations and maintenance covered activities may require land cover mapping to determine applicable conditions. If no land cover mapping is conducted, Permittees will rely on the most recent land cover map developed by the Implementing Entity to quantify impacts.

For covered activities that result in temporary impacts, in lieu of aerial photo or field-verified land cover mapping, applicants have the option of assuming that the entire footprint of the covered activity permanently affects natural land cover types based on the Plan's most recent land cover map (and therefore pays a fee on these impacts as described in Chapter 9). This option is available for temporary impacts because the footprint of many of these activities is expected to be relatively small. If the land cover types assumed to be permanently impacted include those land cover types that trigger covered species surveys, then covered species surveys must be conducted.

The application package must include a map showing all land cover types on the project parcel(s) if the project is located inside the urban service area or within the development area if the project is outside the urban service area, and a table showing the amount of each land cover type to the nearest 0.1 acre for all non-

stream land covers or linear foot for streams (blank tables will be provided in the template application package). These final values will be used to calculate any required fees (Chapter 9).

Table 6-8 describes land cover types and habitat elements that, when present, trigger the need for preconstruction surveys for five covered wildlife species. For example, if a project is located within occupied nesting habitat modeled for burrowing owls, a qualified biologist would need to conduct a habitat survey and possibly a pre-construction survey to map any burrows within 250 feet of the activity footprint. In some cases, presence of the habitat feature itself, regardless of land cover, may trigger additional survey requirements (**Table 6-8**).

The presence of certain land cover types on site may also trigger the need to survey for specific covered plants, as described in Item 5 below.

6.8.4 Item 4: Map of Wetlands, Ponds, Streams, and Riparian Woodlands

A map of all coastal and valley freshwater marsh, seasonal wetlands, ponds, riparian woodland, and streams is required for any project subject to the Habitat Plan that may directly or indirectly affect these aquatic land cover types.

Although Section 404 Clean Water Act wetland delineations are a tool that can be employed, jurisdictional delineations completed to meet the requirements of Section 404 do not necessarily account for all aquatic habitat for species proposed for coverage under this Plan (e.g., they do not address waters of the state that are not also waters of the U.S.). The Implementing Entity will use the wetland and waters map[28] developed for Item 4 of the application package to track impacts to coastal and valley freshwater marsh, seasonal wetlands, ponds, riparian woodland, and streams and to determine the wetland fee owed (see Chapter 9, Section 9.4.1, subheading *Wetland Mitigation Fee* and **Table 9-6**). Fees on wetlands, ponds, and riparian woodland will be determined by the acres of impact (see Condition 12 above and Chapter 9). Stream fees and impacts will be determined by the linear feet of stream affected, measured at the stream centerline.

Project proponents will not need to provide Item 4 of the application package if the Implementing Entity or permitting local jurisdiction determines that aquatic features will not be directly or indirectly affected by covered activities.

Formal delineations are typically required to identify waters of the U.S. and support compliance with Section 404 of the Clean Water Act. Maps of non-jurisdictional aquatic features are typically required to identify waters of the state

[28] Although delineations can be conducted any time of the year, they will be based on an evaluation of multiple factors by a qualified biologist, including but not limited to, hydrology, vegetation, and soils. Wetland features do not need to be holding water at the time of the field investigation to be delineated.

and support compliance with the Porter-Cologne Water Quality Control Act and Section 1602 of the California Fish and Game Code.

Project proponents are encouraged to produce maps for Item 4 that support other necessary state or federal permitting needs, but maps do not need to be verified by the Corps or Regional Boards prior to submission of the application package. If the Habitat Plan application will also meet the application requirements of the Habitat Plan RGP, once such a permit is in place, the delineation method must be consistent with Corps's delineation protocol. Such delineations may be verified by the Corps prior to application submittal, or delineations may be verified by the Corps as part of application processing once the application is submitted.

If a process for permitting projects affecting waters of the U.S. and/or waters of the state is not provided by local jurisdictions or the Implementing Entity in conjunction with the Plan, proponents of projects that could affect such resources must seek such permits on their own. In such cases, this Plan does provide the framework for CESA and ESA compliance for covered activities that would result in impacts on state or federal wetlands and waters.

6.8.5 Item 5: Results of Applicable Species Surveys and Monitoring

As described in Item 3, the presence of certain land cover types on the project site triggers an evaluation of whether specific habitat elements for selected wildlife species or for occurrences of covered plants. **Figure 6-7** summarizes these triggers and survey process. Survey requirements for these selected wildlife species are based on avoiding take of individual species—particularly animals with lower reproductive outputs (e.g., western burrowing owl) than other species (e.g., fish and amphibians). If suitable breeding habitat of these selected wildlife species is found, preconstruction surveys are triggered (see Conditions 15–18). If the preconstruction survey identifies occupied breeding habitat, project proponents must implement defined avoidance and minimization measures to avoid the resource during breeding seasons. Compliance during construction will be monitored by a qualified biologist.

As described below in this section under *Surveys for Covered Plants*, covered plant surveys will be required for specified land cover types. If an occurrence of a covered plant is present on the site, additional field assessment is required to document the occurrence's condition.

The purpose of these surveys is to comply with the avoidance and minimization requirements of ESA and CESA. If surveys are planned far enough in advance (typically 6–8 months), it is expected that in most cases identification of selected occupied habitat will not change the project design or schedule. These survey requirements and avoidance measures are designed to avoid or minimize take of individuals (as required by law), to document key resources for tracking

purposes, and to ensure that impacts on plant occurrences are properly mitigated by the Implementing Entity.

Although surveys are required in specific cases, overall, impacts on covered species are assumed to occur on all project sites. However, if the results of the preconstruction survey documents a large or important population of a covered species other than those acknowledged in the Plan, the local agency reviewing or proposing the project must consult the Implementing Entity for advice on species avoidance and minimization measures[29]. The Implementing Entity will also contact the Wildlife Agencies for technical advice. Protocol-level surveys to document species presence or absence are not required for the Habitat Plan, with the exception of the least Bell's vireo (Condition 16).

Species surveys are required for all covered activities, including some operations and maintenance activities, subject to the conditions on covered activities except as noted in the following section. Species survey requirements and exemptions are described in greater detail below.

Exemptions from Species Surveys, Preconstruction Surveys, and Construction Monitoring

The following types of covered activities are exempt from species survey and construction monitoring requirements for target covered wildlife species and covered plants. A summary of the types of exemptions available is described in **Table 6-1**. Activities exempt from species surveys must still submit an application package as described above.

- Covered operations or maintenance activities, including those on the Reserve System, that do not result in any ground disturbance or removal of natural land cover types not identified in the following exemptions.
- Covered operations or maintenance activities that occur more than once annually within the same location, as long as applicable surveys are conducted once before initiating the activity in the appropriate season (i.e., wildlife and plant surveys must be conducted during the appropriate time of year) and there are negative survey results. Such activities are likely to result in repeated disturbance that will preclude establishment or persistence of the covered species targeted by these surveys. If species surveys identify wildlife covered species, preconstruction surveys and construction monitoring must be conducted according to the conditions in this chapter. Unavoidable impacts to covered plant species will be tracked toward the Plan's impact limits (**Table 5-16**). All applicable wildlife and plant surveys must be conducted prior to implementation of the covered operations or maintenance activity until the covered species has not been detected at the site for three consecutive years. Applicable surveys will once again be

[29] If new information is found through surveys or other data that greatly changes the understanding of covered species distribution or habitat requirements from that described in this Plan, the Plan would need to be re-evaluated and an amendment may be necessary (see Chapter 10 for the amendment process).

required if operations and maintenance activities cease for three or more consecutive years.

- Covered activities that occur entirely on one or more of the following land cover types[30].
  - Coyote brush scrub.
  - Reservoir.
  - Stream (i.e., riverine) where no riparian or wetland vegetation occurs.
  - Agricultural developed[31].
  - Urban-suburban.
  - Rural-residential.
  - Ornamental woodland.

In addition to the exemptions listed above, covered activities occurring on the land cover types listed below, while subject to the wildlife species surveys, preconstruction surveys, and construction monitoring requirements, will not trigger any covered plant surveys[32].

- Willow riparian forest and scrub.
- Redwood forest.
- Coastal and valley freshwater marsh.
- Pond.
- Orchard.
- Vineyard.
- Grain, row crop, hay and pasture, disked/short-term fallowed.
- Golf courses/urban parks.
- Barren.

Qualified Biologists

Several types of monitoring will be conducted for this Plan including species surveys, preconstruction surveys, construction monitoring, and effectiveness monitoring conducted on the Reserve System. This requirement applies to all monitoring described in this Plan including conditions on covered activities described in this chapter and effectiveness monitoring described in Chapter 7.

[30] These land cover types do not support any of the covered species for which surveys are required.
[31] The land cover type "agriculture developed" (also known as agriculture developed/covered ag) is defined in Chapter 3 as intensive agricultural operations such as nurseries and greenhouses.
[32] Focused surveys for selected covered wildlife may still be required; consult **Table 6-8** and Conditions 13 and 15–18.

Qualified biologists are those biologists who have the experience, education, and training necessary to perform the tasks described in this Plan accurately and in an unbiased fashion. The term "qualified biologist" is used generically to mean a biologist who is trained to perform the given task; such a person is, more specifically, a fisheries biologist, wildlife biologist, or botanist. Training must be in the field to which the task is related. For example, a wildlife biologist may not perform a covered plant survey or delineate land covers for a project application unless the individual is also competent in those fields.

If the task does not have the potential to result in take of covered species (e.g., land cover mapping, establishing perimeters around an active nest or burrows, or monitoring the compliance of construction crews), applicants (or Permittees) may choose their own biologists to conduct these specialized tasks. Applicants will provide the local jurisdiction with a brief resume of the biologist so that the local jurisdiction (or in the case of a Permittee project, the Implementing Entity) can verify the qualifications of the biologist. The local jurisdictions will review these qualifications with the application package. If the local jurisdiction finds the qualifications lacking, they may ask the applicant for additional information or for another survey by a more qualified biologist.

If the task has the potential to result in take of covered species (e.g., discouraging use of a den by a San Joaquin kit fox, handling a California tiger salamander, or conducting effectiveness monitoring described in Chapter 7), the biologist must be approved by the Implementing Entity and Wildlife Agencies prior to conducting such tasks. Biologists conducting this work may be Implementing Entity staff or consultants hired by the Implementing Entity.

To be approved, these biologists must provide the Implementing Entity with credentials demonstrating that he or she has an understanding of the monitoring protocols, data collection techniques, and handling procedures for the covered species. If the Implementing Entity deems the biologist qualified, then the Implementing Entity will forward the recommendation to the Wildlife Agencies for approval. The names, contact information, and written certification of training and qualifications for these biologists will be provided to the appropriate Wildlife Agencies for approval. This documentation will also be on file with the Implementing Entity.

Upon Implementing Entity and Wildlife Agency approval, the Implementing Entity will maintain a list of *pre-approved* qualified biologists who may conduct monitoring work for a 5-year period. This approval process will reduce the need for 2081(a) and/or 10(a)(1)(b) permits as well as the need for the Wildlife Agencies to review qualifications on a case-by-case basis during implementation.

Individuals who are not pre-approved by the Implementing Entity and Wildlife Agencies to conduct monitoring with the potential for take may conduct monitoring if they have a valid recovery permit for the species that they are monitoring. In either case, the biologist will possess all of the qualifications that would otherwise be required under a recovery permit.

Surveys for Breeding Habitat of Select Covered Wildlife Species

While take of covered species and impacts to their known and suitable habitat is assumed and mitigated under the regional approach to mitigation and conservation described above, avoidance of breeding habitat for selected covered wildlife species is required. The selected species have the greatest potential to benefit from avoidance measures and are generally species with lower reproductive rates, such as birds and mammals, which suffer greater consequences from take of individuals, particularly when breeding. Survey requirements for these species are triggered by the presence of specific land cover types and habitat features as described in **Table 6-8**. These species and their habitat features are listed below.

- Western burrowing owl (occupied and nesting habitat, see **Figure 5-11**).
- Least Bell's vireo (breeding habitat in South County[33], see species habitat distribution model in **Appendix D**).
- Tricolored blackbird (breeding habitat, see species habitat distribution model in **Appendix D**).
- San Joaquin kit fox in the Pacheco corridor (denning habitat; see species habitat distribution model in **Appendix D**).
- Bay checkerspot butterfly in serpentine bunchgrass grassland inBay checkerspot butterfly habitat units (see **Appendix D**).

If suitable breeding habitat[34] for these species as defined in **Table 6-8** and in Conditions 13 and 15–18 is identified on site, and if the proposed project could affect this habitat, additional preconstruction surveys are required for the San Joaquin kit fox, western burrowing owl, tricolored blackbird, and least Bell's vireo. Specific survey requirements for these species are detailed in Conditions 13 and 15–18. Surveys for these species will occur on all areas on which the land cover fee will be levied and within any areas that may be encroaching within a required species buffer.

If applicable land cover types or habitat features are present on site, the application package must describe the methods used for the required surveys and the results of these surveys. As indicated in **Table 6-8**, a map of habitat features (e.g., suitable kit fox dens, suitable burrowing owl burrows) is required. If a covered species is observed on site, details of this observation will also be included in the application. CNDDB California Native Species Field Survey Forms will be included for all covered species encountered on the site. Copies of these forms will also be submitted to the CNDDB.

[33] The least Bell's vireo range may expand to the northern portion of the study area during the permit term. The Implementing Entity will periodically monitor outside of the vireo's modeled habitat in the study area to determine if the species' range is expanding (see Section 7.3.3 of Chapter 7, *Species-Level Actions*).
[34] Suitable breeding habitat is defined as habitat identified in the field as suitable for breeding by the target species. Suitable breeding habitat may be different from modeled habitat.

Preconstruction Surveys for Select Covered Wildlife

If the appropriate land cover type and habitat feature listed in **Table 6-8** are present on site, then a preconstruction survey is required for one or more of the five covered wildlife species listed above (**Figures 6-5 and 6-6**). Preconstruction surveys will be required to establish presence or absence of occupied breeding habitat for the applicable species. For example, if a freshwater wetland that could provide suitable breeding habitat for tricolored blackbird is present on site, a preconstruction survey on the site would need to be conducted prior to construction to determine if the site is occupied. If results indicate that breeding tricolored blackbirds are present, then avoidance and minimization measures and construction monitoring must occur, as described in **Table 6-8** and Condition 17.

The Habitat Plan application package will be prepared before project construction in order to receive project approvals from the local agency (or if by a Permittee, to ensure compliance with the Habitat Plan). To ensure compliance with preconstruction survey requirements, project proponents must describe in the application package which surveys are required, when they will be performed, and how they will be applied to the project. This description will follow the requirements in **Table 6-8** and Conditions 15–18 and will be incorporated into the conditions of project approval.

Construction Monitoring for Certain Covered Wildlife

Identification of occupied breeding habitat as defined above will trigger the specified avoidance and minimization requirements described in **Table 6-8** and Conditions 15–18. Construction monitoring will be carried out by a qualified biologist to ensure that these avoidance and minimization requirements are being implemented properly and that they are adequately protecting the target species (**Figures 6-4, 6-5, and 6-6**). Because the selected wildlife species are rare in the study area, it is expected that few projects will require construction monitoring. If required, the construction monitoring frequency and protocols are described for the appropriate species in Conditions 15–18.

Like preconstruction surveys, construction monitoring will occur well after the Habitat Plan application package is prepared. To ensure compliance with the Plan, the application package must describe which construction monitoring and avoidance and minimization requirements may be required and how they will be applied to the project if preconstruction surveys identify occupied breeding habitat. This description will follow the requirements in **Table 6-8** and Conditions 15–18 and will be incorporated into the conditions of project approval. The application will include a description of monitoring frequency and duration (including the time when monitoring will be initiated relative to impacts) and specific construction activities to be monitored. The application will also include a description of the authority of the onsite construction monitor to modify or temporarily stop implementation of the activity if necessary to ensure compliance with the Plan.

Construction monitoring is necessary to ensure that avoidance and minimization measures are implemented in accordance with permit requirements and is the responsibility of the project proponent.

Covered Plant Surveys

Project proponents wishing to affect occurrences of covered plants must notify the Implementing Entity of their construction schedule to allow the Implementing Entity the opportunity to salvage the occurrence (see Condition 19).

The application package must describe the methods used for the required plant surveys and the results of these surveys. If a covered plant occurrence is observed on site, the condition of this occurrence must be described in the application package according to the guidelines in Chapter 5, Section 5.3.1 *Land Acquisition and Restoration Activities* subheading *Incorporating Covered Plant Species*. The condition of each covered plant occurrence must be documented to ensure that occurrences are protected within the Reserve System that are in as good or better condition than those lost to covered activities. CNDDB California Native Species Field Survey Forms will be included in the application package for all covered plants encountered on the site. Copies of these forms will be submitted to the CNDDB.

6.8.6 Item 6: Compliance Documentation

The final component of the Habitat Plan application package is documentation of how any remaining applicable conditions (Conditions 1–14) have been incorporated into the proposed project. If appropriate, a map will be provided to document this compliance.

Verification that conditions have been implemented is primarily the responsibility of the local jurisdiction conducting or approving the covered activity. Participating local jurisdictions will be responsible for reporting the relevant details of approved projects to the Implementing Entity (for entry into the Habitat Plan database and for required reporting to the Wildlife Agencies). The Implementing Entity may contact the local jurisdiction to verify and ensure that the conditions are appropriately implemented.

If the project includes activities for which temporary fees are paid, the project applicant is required to file compliance information at the conclusion of the project. The compliance information will include documentation that the area for which temporary fees were paid was disturbed by covered activities for less than one year. The project proponent must also provide photographs that document the condition of the site before project initiation and (or less) after completion of the covered activity. Based on this information, the local jurisdiction or Implementing Entity will make a determination that the site was recovered to pre-project or ecologically improved conditions within one year of completing

construction, that the impacts were actually temporary, and that the fees paid were adequate.

6.9 Confirming Exemption from the Plan

Project proponents seeking permits from a local jurisdiction for activities that would otherwise be covered will need to demonstrate that the project is not a covered activity per the criteria in Chapter 2. Project proponents will need to:

1. demonstrate the size of the project;
2. show that the project is located in an area in **Figure 6-8** where private development is not subject to the Plan;
3. provide a map consistent with the requirements in Section 6.8.3 *Item 3: Land Cover Types on Site* showing that no serpentine, wetland, stream, riparian, or pond land cover types are present on the site;
4. demonstrate that no adverse indirect impacts to wetlands were identified through the applicable environmental review process; and
5. demonstrate that the project is not located in occupied nesting habitat for western burrowing owl based on the most recent western burrowing owl occupied nesting habitat map provided by the Implementing Entity.

Table 6-1. Covered Activities Exempt from Plan Conditions and/or Plan Fees

Covered Activity	Exemptions from Conditions (✓ = exempt)					
	All Chapter 6 Conditions	Wildlife Species Surveys (Conditions 15–18)	Preconstruction Surveys (Conditions 15–18)	Construction Monitoring (Conditions 15–18)	Covered Plant Surveys (Condition 20)	Development Fees[1]
Public Activities						
Routine infrastructure maintenance by public agencies within the planning limit of urban growth that do not affect stream, riparian, serpentine, ponds, or wetland land cover types.	✓	✓	✓	✓	✓	
Routine infrastructure maintenance by public agencies that occurs in urban-suburban, landfill, reservoir, or agriculture developed land cover types that do not affect stream, riparian, serpentine, pond, or wetland cover types. Examples of such activities include filling pot-holes and resurfacing existing roads without expansion of the paved area.	✓	✓	✓	✓	✓	
Private Activities						
Projects that do not result in ground disturbance, do not result in release of potential water quality contaminants, or do not create new wildlife barriers.	✓	✓	✓	✓	✓	
Private-sector, routine-maintenance activities that require a development, grading, or building permit, and that occur inside the Urban Service Area[2].	✓	✓	✓	✓	✓	
Private-sector, routine-maintenance activities that require a development, grading, or building permit; that occur outside of the Urban Service Area; and that occur within 50 feet of all existing structures at the time of Plan commencement or within 50 feet of structures that are permitted for incidental take under the Habitat Plan.	✓	✓	✓	✓	✓	
Additions to existing structures, or new structures that are within 50 feet of an existing structure (e.g., a new garage) that result in less than 5,000 square feet of impervious surface as long as no stream, riparian woodland, wetlands, ponds, or serpentine land cover type are affected[3].	✓	✓	✓	✓	✓	✓

Covered Activity	Exemptions from Conditions (✓ = exempt)					
	All Chapter 6 Conditions	Wildlife Species Surveys (Conditions 15–18)	Preconstruction Surveys (Conditions 15–18)	Construction Monitoring (Conditions 15–18)	Covered Plant Surveys (Condition 20)	Development Fees[1]
Any covered activity described in Chapter 2 that occurs in urban-suburban, landfill, reservoir, or agriculture developed land cover types as verified in the field, unless the activity may affect a mapped or unmapped stream, riparian, serpentine, ponds, or wetland land cover types, or the activity is located in a stream setback.	✓	✓	✓	✓	✓	
A covered activity on a parcel of less than 0.5 acre or less as long as no serpentine, stream, riparian woodland, pond, or wetland land cover type is within the parcel.	✓	✓	✓	✓	✓	
Covered operations or maintenance activities, including those on the Reserve System, that do not result in any ground disturbance or removal of natural land cover types.		✓	✓	✓		
Covered operations or maintenance activities that occur more than once annually within the same location, as long as applicable surveys are conducted once before initiating the activity and there are negative survey results[4, 5].		✓	✓	✓		
Covered activities that occur entirely on one or more of the following land cover types: coyote brush scrub, reservoir, stream (i.e., riverine) where no riparian or wetland vegetation occurs, agricultural developed[6], urban-suburban, rural-residential, or ornamental woodland.		✓	✓	✓		
Covered activities that occur entirely on one or more of the following land cover types: willow riparian forest and scrub, redwood forest, coastal and valley freshwater marsh, pond, orchard, vineyard, grain, row crop, hay and pasture, disked/short-term fallowed, golf courses/urban parks or barren.					✓	
Urban development covered activities (see Section 2.3.2 *Urban Development* in Chapter 2) in Zones A, B, or C on parcels less than 0.5 acre as long as the parcel does not contain or is not adjacent to a stream, riparian woodland or forest, wetland, pond, or serpentine land cover type[8].						✓

Covered Activity	Exemptions from Conditions (✓ = exempt)					
	All Chapter 6 Conditions	Wildlife Species Surveys (Conditions 15–18)	Preconstruction Surveys (Conditions 15–18)	Construction Monitoring (Conditions 15–18)	Covered Plant Surveys (Condition 20)	Development Fees[1]
All development that occurs on land mapped by the Habitat Plan as "urban-suburban", "landfill", "reservoir", or "agriculture developed" land cover types if it is not located in or adjacent to a parcel that contains a stream, riparian woodland or forest, wetland, or serpentine land cover type[9, 10].						✓
Construction of recreational facilities within the Reserve System[11].						✓

Notes:

[1] Does not include the Nitrogen Fee. See Chapter 9 for a complete discussion of all Development Fees.

[2] Private-sector activities that do not require a development, grading, or building permit are not subject to the Plan or its conditions or fees.

[3] Additions are cumulative and must be calculated based on the footprint of the structure at time of Plan implementation to determine whether this threshold has been crossed.

[4] Such activities are likely to result in repeated disturbance that will preclude establishment or persistence of the covered wildlife species targeted by these surveys.

[5] If surveys identify covered species, subsequent surveys must be conducted.

[6] The land cover type "agriculture developed" (also known as agriculture developed/covered ag) is defined in Chapter 3 as intensive agricultural operations such as nurseries and greenhouses.

[7] These land cover types do not support any of the covered species for which surveys are required.

[8] If new vehicle trips are generated, the nitrogen deposition fee may be assessed.

[9] The category "reservoir" excludes dams, which are subject to Habitat Plan fees.

[10] Barns, corrals, ranch homes, and other small patches of existing development were not mapped as these four exempt land cover types because they fell below the 10-acre minimum mapping unit. These sites would also be exempt from the same development fees as long as project proponents demonstrate that they were existing at the time of Plan adoption through air photos or other documentation.

[11] Instead of paying a fee for construction of infrastructure within the Reserve System, new disturbance for infrastructure does not count toward land cover type land acquisition requirements in Chapter 5, but it does count toward the total Reserve System size requirements.

Table 6-2. Aquatic Avoidance and Minimization Measures [**Modified January 30, 2018**]

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
1	Minimize the potential impacts on covered species most likely to be affected by changes in hydrology and water quality.	All	No
2	Reduce stream pollution by removing pollutants from surface runoff before the polluted surface runoff reaches local streams.	All	Yes
3.1	Maintain the current hydrograph.	All	Yes
3.2	To the extent possible, restore the hydrograph to more closely resemble predevelopment conditions.	All	No
5	Invasive plant species removed during maintenance will be handled and disposed of in such a manner as to prevent further spread of the invasive species.	All	No
7	Personnel shall prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels.	All	Yes
8	Spill prevention kits shall always be in close proximity when using hazardous materials (e.g., crew trucks and other logical locations).	All	Yes
11	Vehicles shall be washed only at approved facilities. No washing of vehicles shall occur at job sites.	All	Yes
14	If high levels of groundwater in a work area are encountered, the water is pumped out of the work site. If necessary to protect water quality, the water shall be directed into specifically constructed infiltration basins, into holding ponds, or onto areas with vegetation to remove sediment prior to the water re-entering a creek.	All	Yes
34	Use the minimum amount of impermeable surface (building footprint, paved driveway, etc.) as practicable.	All	Yes
35	Use pervious materials, such as gravel or turf pavers, in place of asphalt or concrete to the extent practicable.	All	Yes
36	Use flow control structures such as swales, retention/detention areas, and/or cisterns to maintain the existing (pre-project) peak runoff.	All	Yes
37	Direct downspouts to swales or gardens instead of storm drain inlets.	All	Yes
39	Minimize alterations to existing contours and slopes, including grading the minimum area necessary.	All	Yes
40	Maintain native shrubs, trees and groundcover whenever possible and revegetate disturbed areas with local native or non-invasive plants.	All	Yes
41	Combine flow-control with flood control and/or treatment facilities in the form of detention/retention basins, ponds, and/or constructed wetlands.	All	Yes
42	Use flow control structures, permeable pavement, cisterns, and other runoff management methods to ensure no change in post-construction peak runoff volume from pre-project conditions for all covered activities with more than 5,000 square feet of impervious surface.	All	Yes
51	All projects will be conducted in conformance with applicable County and/or city drainage policies.	All	Yes

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

Table 6-2. Continued

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
53	When possible, maintain a vegetated buffer strip between staging/excavation areas and receiving waters.	All	No
61	Minimize ground disturbance to the smallest area feasible.	All	Yes
62	Use existing roads for access and disturbed area for staging as site constraints allow. Off-road travel will avoid sensitive communities such as wetlands and known occurrences of covered plants.	All	No
63	Prepare and implement sediment erosion control plans.	All	Yes
64	No winter grading unless approved by the local jurisdiction and specific erosion control measures are incorporated.	All	Yes
65	Control exposed soil by stabilizing slopes (e.g., with erosion control blankets) and protecting channels (e.g., using silt fences or straw wattles).	All	Yes
66	Control sediment runoff using sandbag barriers or straw wattles.	All	Yes
67	No stockpiling or placement of erodible materials in waterways or along areas of natural stormwater flow where materials could be washed into waterways.	All	Yes
68	Stabilize stockpiled soil with geotextile or plastic covers. Materials that may entrap reptiles and amphibians, such as mono-filament erosion control materials, shall be avoided.	All	Yes
69	Maintain construction activities within a defined project area to reduce the amount of disturbed area.	All	Yes
70	Only clear/prepare land which will be actively under construction in the near term.	All	No
71	Preserve existing vegetation to the extent possible.	All	Yes
72	Equipment storage, fueling and staging areas will be sited on disturbed areas or non-sensitive habitat outside of a stream channel.	All	Yes
73	When possible, avoid wet season construction.	All	No
74	Stabilize site ingress/egress locations.	All	Yes
75	Dispose of all construction waste in designated areas and prevent stormwater from flowing onto or off of these areas.	All	Yes
76	Prevent spills and clean up spilled materials.	All	Yes
77	Sweep nearby streets at least once a day.	All	Yes
83	Sediments will be stored and transported in a manner that minimizes water quality impacts. If soil is stockpiled, no runoff will be allowed to flow back to the channel.	All	Yes
84.1	Appropriate erosion control measures (e.g., fiber rolls, filter fences, vegetative buffer strips) will be used on site to reduce siltation and runoff of contaminants into wetlands, ponds, streams, or riparian vegetation. Erosion control measures will be placed between the outer edge of the buffer and the project site.	All	Yes
84.2	Fiber rolls used for erosion control will be certified as free of noxious weed seed.	All	No
84.3	Filter fences and mesh will be of material that will not entrap reptiles and amphibians.	All	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

Table 6-2. Continued

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
86	Topsoil removed during soil excavation will be preserved and used as topsoil during revegetation when it is necessary to conserve the natural seed bank and aid in revegetation of the site.	All	No
88	To the extent feasible, vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas.	All	No
89	The potential for traffic impacts on terrestrial animal species will be minimized by adopting traffic speed limits.	All	No
90	All trash will be removed from the site daily to avoid attracting potential predators to the site. Personnel will clean the work site before leaving each day by removing all litter and construction-related materials.	All	No
93	When accessing upland areas adjacent to riparian areas or streams, access routes on slopes of greater than 20% should generally be avoided. Subsequent to access, any sloped area should be examined for evidence of instability and either revegetated or filled as necessary to prevent future landslide or erosion.	All	No
94	Personnel shall use existing access ramps and roads if available. If temporary access points are necessary, they shall be constructed in a manner that minimizes impacts to streams.	All	Yes
95	To minimize entrapment of animals on job sites, the project biologist will survey the work area at the close daily activities to identify and remediate any potential areas or conditions that might trap animals. Examples of such include pits, trenches or pipes that animals can fall into or perforated pipes or netting that can cause entanglement. The biologist shall consider the animals expected to enter the site during the calendar period work will be occurring, and shall use his or her best judgment to remove entrapment conditions, allow for escape (such as a ramp not exceeding a 30-degree slope leading out of a trench) or develop a site-specific protocol (such as daily post-dawn surveys) to eliminate or minimize entrapment. If no project biologist is required on-site the job foreman or property owner will designate an individual to carry out these activities. Only individuals that hold permits or that have been approved by the Habitat Agency as a qualified biologist may handle listed species.	All	No
97	Erosion control measures shall be in place at all times during construction. Do not start construction until all temporary control devices (straw bales, silt fences, etc.) are in place downstream of project site.	All	Yes
99	Conduct street cleaning on a regular basis.	All	Yes
100	Potential contaminating materials must be stored in covered storage areas or secondary containment that is impervious to leaks and spills	All	Yes
101	Runoff pathways shall be free of trash containers or trash storage areas. Trash storage areas shall be screened or walled	All	Yes

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Table 6-2. Continued

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
103	Unless otherwise indicated in an Executive Directive issued by the Habitat Agency, for example a directive to address plant pathogens, (103.1) all disturbed soils will be revegetated with native plants, grasses, seed mixtures, or sterile nonnative species suitable for the altered soil conditions upon completion of construction. (103.2) Local watershed native plants will be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives. (103.3) All disturbed areas that have been compacted shall be de-compacted prior to planting or seeding. (103.4) Cut-and-fill slopes will be planted with local native or non-invasive plants suitable for the altered soil conditions.	All	No
104	Measures will be utilized on site to prevent erosion along streams (e.g., from road cuts or other grading), including in streams that cross or are adjacent to the project proponent's property. Erosion control measures will utilize natural methods such as erosion control mats or fabric, contour wattling, brush mattresses, or brush layers. For more approaches and detail, please see the *Bank Protection/ Erosion Repair Design Guide* in the Santa Clara Valley Water Resources Protection Collaborative's *User Manual: Guidelines & Standards for Land Use Near Streams* (Santa Clara Valley Water Resources Protection Collaborative 2006).	All	Yes
112	Pumps and generators shall be maintained and operated in a manner that minimizes impacts to water quality and aquatic species.	All	Yes
114	Erosion control methods shall be used as appropriate during all phases of routine maintenance projects to control sediment and minimize water quality impacts.	All	Yes
105	Vegetation and debris must be managed in and near culverts and under and near bridges to ensure that entryways remain open and visible to wildlife and that passage through the culvert or bridge remains clear.	Culverts and Bridges	No
52	Adhere to the siting criteria described for the borrow site covered activity (see Chapter 2 for details).	Dams (seismic retrofit)	No
4	Reduce the potential for scour at stormwater outlets to streams by controlling the rate of flow into the streams.	In-stream (in water)	No
6	Activities in the active (i.e., flowing) channel will be avoided whenever possible. If activities must be conducted in the active channel, applicable avoidance and minimization measures identified in this table will be enforced.	In-stream (in water)	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

Table 6-2. Continued

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
10	(10.1) If ground disturbing activities are planned for a stream channel that is known or suspected to contain elevated levels of mercury, the following steps shall be taken. (10.2) 1. Avoid disturbing soils in streams known or suspected to contain high levels of mercury. (10.3) 2. Soils that are likely to be disturbed or excavated shall be tested for mercury. Soils shall be remediated if: (10.4) a. disturbed or excavated soils exposed to flood flows below the 2.33-year channel flow level exceed 1 ppm Hg, or (10.5) b. disturbed or excavated soils above the 2.33-year flow level exceed 20 ppm Hg. (10.5) 3. The channel must be dewatered prior to commencement of the activity. (10.6) 4. Personnel shall implement measures to ensure that hazardous materials are properly handled and disposed of. (10.7) 5. If tested soils indicate an elevated level of mercury, the frequency of wetting and drying sediments during project activities will be minimized.	In-stream (in water)	No
12	Unless allowed by other regulatory permits, no equipment servicing shall be done in the stream channel or immediate flood plain.	In-stream (in water)	No
13	Personnel shall use the appropriate equipment for the job that minimizes disturbance to the channel bed and banks. Appropriately-tired vehicles, either tracked or wheeled, shall be used depending on the situation	In-stream (in water)	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
15	If native fish or non-covered, native aquatic vertebrates are present when cofferdams, water bypass structures, and silt barriers are to be installed, a native fish and aquatic vertebrate relocation plan shall be implemented when ecologically appropriate as determined by a qualified biologist to ensure that significant numbers of native fish and aquatic vertebrates are not stranded. Prior to the start of work or during the installation of water diversion structures, native aquatic vertebrates shall be captured in the work area and transferred to another reach as determined by a qualified biologist. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Capture and relocation of aquatic native vertebrates is not required at individual project sites when site conditions preclude reasonably effective operation of capture gear and equipment, or when the safety of biologist conducting the capture may be compromised. Listed species not covered by the Habitat Plan will not be relocated without the appropriate permits and authorizations from the correct agencies. Relocation of native fish or aquatic vertebrates may not always be ecologically appropriate. Prior to capturing native fish and/or vertebrates, the qualified biologist will use a number of factors, including site conditions, system carrying capacity for potential relocated fish, and flow regimes (e.g., if flows are managed) to determine whether a relocation effort is ecologically appropriate. If so, the following factors will be considered when selecting release site(s): 1. similar water temperature as capture location; 2. ample habitat availability prior to release of captured individuals; 3. presence of other same species so that relocation of new individuals will not upset the existing prey/predation function; 4. carrying capacity of the relocation location; 5. potential for relocated individual to transport disease; and 6. low likelihood of fish reentering work site or becoming impinged on exclusion net or screen; 7. Presence of aquatic predators Proposals to translocate any covered species will be reviewed and approved by the Wildlife Agencies.	In-stream (in water)	No
17	When work in a flowing stream is unavoidable, the work area will be isolated from the stream. This may be achieved by diverting entire streamflow around the work area by a pipe or open channel. Coffer dams shall be installed both upstream and downstream not more than 100 feet from the extent of the work areas. Coffer dam construction shall be adequate to prevent seepage into or from the work area. Where feasible, water diversion techniques shall allow stream flows to gravity flow around or through the work site. If gravity flow is not feasible, stream flows may be pumped around the work site using pumps and screened intake hoses. If a pump is used, it shall be operated at the rate of flow that passed through the site; pumping rates shall not be dewater nor impound water on the upstream side of the coffer dam. Sumps or basins may also be used to collect water, where appropriate (e.g., in channels with low flows). The work area will remain isolated from flowing water until any necessary erosion protection is in place. All water shall be discharged in a non-erosive manner (e.g., gravel or vegetated bars, on hay bales, on plastic, on concrete, or in storm drains when equipped with filtering devices, etc.).	In-stream (in water)	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

Table 6-2. Continued

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
18	If a bypass will be of open channel design the berm confining the channel may be constructed of material from the channel.	In-stream (in water)	No
20	Diversions shall maintain ambient flows below the diversion, and waters discharged below the project site shall not be diminished or degraded by the diversion. All materials placed in the channel to dewater the channel shall be removed when the work is completed. Dirt, dust, or other potential discharge material in the work area will be contained and prevented from entering the flowing channel. Normal flows shall be restored to the affected stream as soon as is feasible and safe after completion of work at that location.	In-stream (in water)	No
21	To the extent that stream bed design changes are not part of the project, the stream bed, including the low-flow channel, will be returned to as close to pre-project condition as possible unless the pre-existing condition was detrimental to channel condition as determined by a qualified biologist or hydrologist.	In-stream (in water)	No
22	, Unless there is an extenuating circumstance as agreed to by the Habitat Agency or Wildlife Agencies, all temporary diversion structures and the supportive material shall be removed no more than 48 hours after work is completed.	In-stream (in water)	No
23	Temporary fills, such as for access ramps, diversion structures, or cofferdams, shall be completely removed upon finishing the work.	In-stream (in water)	No
24	To prevent increases in temperature and decreases in dissolved oxygen (DO), if bypass pipes are used, they shall be properly sized (i.e., larger diameter pipes to better pass the flows). Use of bypass pipes may be avoided by creating a low-flow channel or using other methods to isolate the work area.	In-stream (in water)	No
25	Diversions shall maintain fish passage when the project meets the following conditions: 1) the length of the area dewatered exceeds 500 feet, and/or 2) the length of time the stream is dewatered exceeds two weeks in length. Conditions for fish passage shall be met as long as the diversion 1) maintains contiguous flows through a low flow channel in the channel bed or an artificial open channel, 2) presents no vertical drops exceeding six (6) inches and follows the natural grade of the site, 3) is conducted such that water at the downstream end does not scour the channel bed or banks; and 4) maintains water depths in the bypass channel that exceed average depths in the 150 feet of stream upstream of the beginning of the bypass channel. A qualified biologist may make adjustments on a site-specific basis if determined to be beneficial to the fish. An artificial channel used for fish passage shall be made of impervious material to prevent loss of flows and lined with cobble/gravel. A closed conduit pipe shall not be used for fish passage. The inlets of diversions shall be checked daily to prevent accumulation of debris. If block nets are being used to keep leaf litter/debris out of the diversion, they should be checked at least twice per day.	In-stream (in water)	No
26	Any sediment removed from a project site shall be stored and transported in a manner that minimizes water quality impacts.	In-stream (in water)	No
27	Unless otherwise indicated in an Executive Directive issued by the Habitat Agency, sediment from the San Francisco Bay Watershed, including that for reuse, will not be removed to areas any farther south than Metcalf Road in south San Jose.	In-stream (in water)	No
30	Vegetation control and removal in channels, on stream banks, and along levees and maintenance roads shall be limited to removal necessary for facility inspection purposes, or to meet regulatory requirements or guidelines.	In-stream (in water)	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

Table 6-2. Continued

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
31	(31.1) When conducting vegetation management, retain as much understory brush and as many trees as feasible, emphasizing shade-producing and bank-stabilizing vegetation. Carry out the activity in such a manner as to minimize impacts to the natural community present and encourage regrowth of the community structure appropriate to the site. (31.2) If riparian vegetation is to be removed with chainsaws, consider using saws currently available that operate with vegetable-based bar oil.	In-stream (in water)	No
32	In-channel vegetation removal may result in increased local erosion due to increased flow velocity. To minimize the effect, the top of the bank shall be protected by leaving vegetation in place to the maximum extent possible.	In-stream (in water)	No
33	Regional Board objectives for temperature change in receiving waters (measured 100 feet downstream of discharge point) shall not be exceeded. Receiving water and discharge water may be monitored for temperature changes after a comparison of ambient temperature to pipeline water temperature suggests the potential for change.	In-stream (in water)	No
43	Site characteristics will be evaluated in advance of project design to determine if non-traditional designs, such as bioengineered bank treatments that incorporate live vegetation, can be successfully utilized while meeting the requirements of the project.	In-stream (in water)	No
44	Maintenance of natural stream characteristics consistent with the stream section, such as riffle-pool sequences, riparian canopy, sinuosity, floodplain, and a natural channel bed, will be incorporated into the project design.	In-stream (in water)	No
45	Stream crossings shall incorporate a free-span bridge unless infeasible due to engineering or cost constraints or unsuitable based on minimal size of stream (swale without bed and banks or a very small channel). If a bridge design cannot free-span a stream, bridge piers and footings will be designed to have minimum impact on the stream. A hydraulics analysis must be prepared and reviewed by the jurisdictional partner, including SCVWD as appropriate, demonstrating that piers or footings will not cause significant scour or channel erosion. Whenever possible, the span of bridges will also allow for upland habitat beneath the bridge to provide undercrossing areas for wildlife species that will not enter the creek. Native plantings, natural debris, or scattered rocks will be installed under bridges to provide wildlife cover and encourage the use of crossings.	In-stream (in water)	No
47	If a culvert is used, up- and downstream ends of the culvert must be appropriately designed so that the stream cannot flow beneath the culvert or create a plunge pool at the downstream end. Preference will be given to designs that allow a natural bottom (arch culvert) and/or which do not alter natural grade.	In-stream (in water)	No
49	The project or activity must be designed to avoid the removal of native riparian vegetation, where feasible. If the removal native of riparian vegetation is necessary, the amount shall be minimized to the amount necessary to accomplish the required activity and comply with public health and safety directives. Impacts to non-native vegetation that is determined to be providing unique habitat value (such as shading, foraging habitat, or nesting area) shall be avoided and minimized in the same manner as native vegetation.	In-stream (in water)	No
54	Deep pools within stream reaches shall be maintained as refuge for fish and wildlife to the maximum extent practicable by constructing temporary fencing and/or barriers so as to avoid pool destruction and prevent access from the project site.	In-stream (in water)	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

Table 6-2. Continued

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
56	Increased water velocity at bank protection sites may increase erosion downstream. Therefore, bank stabilization site design shall consider hydraulic effects immediately upstream and downstream of the work area. Bank stabilization projects will be designed and implemented to provide similar roughness and characteristics that may affect flows as the surrounding areas just upstream and downstream of the project site.	In-stream (in water)	No
78	In-stream projects occurring while the stream is flowing must use appropriate measures to protect water quality, native fish and covered wildlife species at the project site and downstream of the project site.	In-stream (in water)	No
80	All personnel working within or adjacent to the stream setback (i.e., those people operating ground-disturbing equipment) will be trained by a qualified biologist in these avoidance and minimization measures and the permit obligations of project proponents working under this Plan.	In-stream (in water)	No
87	Vehicles operated within and adjacent to streams will be checked and maintained daily to prevent leaks of fluids and lubricants.	In-stream (in water)	No
91	To prevent the spread of exotic species and reduce the loss of native species, aquatic species will be netted at the drain outlet when draining reservoirs or ponds to surface waters. Captured native fish, native amphibians, and western pond turtles will be relocated if ecologically appropriate. Exotic species will be dispatched.	In-stream (in water)	No
92	To minimize the spread of pathogens all staff working in aquatic systems (i.e., streams, ponds, and wetlands)—including site monitors, construction crews, and surveyors—will adhere to the most current guidance for equipment decontamination provided by the Wildlife Agencies at the time of activity implementation. Guidance may require that all materials that come in contact with water or potentially contaminated sediments, including boot and tire treads, be cleaned of all organic matter and scrubbed with an appropriate cleansing solution, and that disposable gloves be worn and changed between handling equipment or animals. Care should be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.	In-stream (in water)	No
98	When needed, utilize in-stream grade control structures to control channel scour, sediment routing, and headwall cutting.	In-stream (in water)	No
102	Immediately after project completion and before close of seasonal work window, stabilize all exposed soil with mulch, seeding, and/or placement of erosion control blankets	In-stream (in water)	Yes
106	Prior to undertaking stream maintenance activities, reach conditions will be assessed to identify tasks that are necessary to maintain or enhance the channel for the purposes for which it was designed and/or intended (e.g., habitat values; flood control, groundwater recharge). Only in-stream work that is necessary to maintain the channel will be conducted and potentially conflicting uses will be balanced to the greatest extent practicable.	In-stream (in water)	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

Table 6-2. Continued

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
107	On streams managed for flood control purposes, when stream reaches require extensive vegetation thinning or removal (e.g., when the channel has been fully occluded by willows or other vegetation), removal will be phased so that some riparian land cover remains and provides some habitat value. In addition, vegetation removal will be targeted and focused on removing the least amount of riparian vegetation as possible while still meeting the desired flood control needs. For example, vegetation removal should be focused on shrubby undergrowth at the toe-of-slope that is most likely to increase roughness and create a flooding hazard. Vegetation on the upper banks, particularly mature tree canopy, should be maintained to the extent possible to provide habitat for birds and small mammals and shading for the active channel.	In-stream (in water) and Riparian	No
108	When reaches require sediment removal, approaches will be considered that may reduce the impacts of the activity. Examples of potential approaches include phasing of removal activities or only removing sediment along one half of the channel bed, allowing the other half to remain relatively undisturbed.	In-stream (in water)	No
109	In streams not managed for flood control purposes, woody material (including live leaning trees, dead trees, tree trunks, large limbs, and stumps) will be retained unless it is threatening a structure, or is causing excessive bank failure and increasing sediment loading to the stream.	In-stream (in water)	No
110	If debris blockages threaten bank stability and may increase sedimentation of downstream reaches, debris will be removed. When clearing natural debris blockages (e.g., branches, fallen trees, soil from landslides) from the channel, only remove the minimum amount of debris necessary to maintain flow conveyance (i.e., prevent significant backwatering or pooling). Non-natural debris (e.g., trash, shopping carts, etc.) will be fully removed from the channel.	In-stream (in water)	No
111	Bank repairs will use only compacted soil if site conditions allow and the repair is not likely to fail again. If compacted soil is not sufficient to stabilize the slope, bioengineering techniques must be used. No hardscape (e.g., concrete or any sort of bare riprap) or rock gabions may be utilized in streams not managed for flood control except in cases where infrastructure or human safety is threatened (e.g., undercutting of existing roads). Rock riprap may only be used to stabilize channels experiencing extreme erosion, and boulders must be backfilled with soil and planted with willows or other native riparian species suitable for planning in such a manner.	In-stream (in water)	No
50	If levee reconstruction requires the removal of vegetation that provides habitat value to the adjacent stream (e.g., shading, bank stabilization, food sources, etc.), then the project will include replacement of the vegetation/habitat that was removed during reconstruction unless it is determined to be inappropriate to do so by the relevant resource agencies (e.g., CDFG and USFWS).	Levees	No
29	Existing native vegetation shall be retained by removing only as much vegetation as necessary to accommodate the trail clearing width. Maintenance roads should be used to avoid effects on riparian corridors.	Trails	No
48	Trails will be sited and designed with the smallest footprint necessary to cross through the in-stream area. Trails will be aligned perpendicular to the channel and be designed to avoid any potential for future erosion. New trails that follow stream courses will be sited outside the riparian corridor.	Trails	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

Table 6-2. Continued

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
57	When parallel to a stream or riparian zone and not located on top of a levee, new trails shall be located behind the top of bank or at the outside edge of the riparian zone except where topographic, resource management, or other constraints or management objectives make this not feasible or undesirable.	Trails	No
58	Existing access routes and levee roads shall be used if available to minimize impacts of new construction in special status species habitats and riparian zones.	Trails	No
59	Trails in areas of moderate or difficult terrain and adjacent to a riparian zone shall be composed of natural materials or shall be designed (e.g., a bridge or boardwalk) to minimize disturbance and need for drainage structures, and to protect water quality.	Trails	No
60	Trail crossings of freshwater stream zones and drainages shall be designed to minimize disturbance, through the use of bridges or culverts, whichever is least environmentally damaging. Structures over water courses shall be carefully placed to minimize disturbance. Erosion control measures shall be taken to prevent erosion at the outfalls of drainage structures.	Trails	Yes

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

Table 6-3. Conditions on Covered Transportation Projects

Design Requirements and Construction Practices	Highway Projects	Roadway Projects [1] and Interchange Upgrades	Mass Transit Projects	Road Safety and Operational Improvements	Dirt Road Construction
Transportation Project Design Requirements					
Background data collection by Habitat Plan Implementing Entity	R	R	R	–	–
Design coordination with Wildlife Agencies[2]	R	R	R	–	–
Enhance existing undercrossings	R	R	R	R	–
• Implement minimum sizing of culverts	R	R	R	R	–
• Install grating over tunnels/culverts for light penetration	P	P	P	P	–
• Install fencing around undercrossings to maximize crossing use	R	R	R	R	–
Road or rail barrier and passage designs for wildlife (to direct wildlife to safe crossings)	R	P	R	R	–
Construction Practices					
Avoidance and minimization measures	R	R	R	R	R
Post-Construction Practices					
Control roadside vegetation adjacent to reserves	R	R	R	R	R
Revegetate cut/fill slopes with native vegetation	R	R	R	R	R
Vegetation management around undercrossings	R	R	R	R	R

Notes:

R = Required

P = Possible (required unless data demonstrate action would not benefit wildlife and CDFG and USFWS agree to omit).

[1] Major roadway projects are identified in Table 2-6 and include those projects most likely to adversely affect habitat linkages in the study area.

[2] The scope of this review will be limited to the design, location, and extent of the median barrier.

Table 6-4. Rural Road Maintenance Avoidance and Minimization Measures

		Sediment Management and Erosion Control							Road Maintenance									
Avoidance and Minimization Measures		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
1	Incorporate erosion control into the planning, construction and follow up phases for all road activities.	X	X	X		X	X	X	X	X	X	X	X	X		X		
2	If working during times when rain might be possible, always have erosion control measures onsite in case of a storm event.	X	X	X		X	X	X	X	X	X	X	X	X				
3	Plan for projects involving disturbance of soil (earthwork) within the riparian setback to occur during the salmonid avoidance season (June 15–October 15) with the exception of emergency or public safety related projects (e.g., clearing a landslide across a road). If avoidance is not possible, utilize appropriate avoidance and minimization measures as described in Conditions 4 and 5.	X	X	X		X	X	X	X	X	X	X	X	X		X		X
4	Set up the work and staging area to minimize the area of soil that will be disturbed and the tracking of soil out of the work area by vehicles and equipment.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	When possible, avoid staging projects in areas where runoff will be concentrated.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	Do not stage maintenance equipment in riparian areas or adjacent to streams with the exception of emergency or public safety related projects where no other staging options exist. Avoidance and minimization measures described in Conditions 4 and 5 will be applied as appropriate.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	Use appropriate erosion and sediment control avoidance and minimization measures to secure the staging and project area so that sediment runoff is avoided. Avoidance and minimization measures described in Conditions 4 and 5 will be applied as appropriate.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	Protect storm drain inlets and watercourses using appropriate avoidance and minimization measures. Avoidance and minimization measures described in Conditions 4 and 5 will be applied as appropriate.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	Mulch or revegetate bare soil adjacent to stream channels, or other flow transport paths, to the break-in-slope near those areas.	X	X	X	X	X			X	X		X	X			X		

		Sediment Management and Erosion Control							Road Maintenance									
Avoidance and Minimization Measures		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
10	Keep runoff from bare soil well dispersed across a vegetated area to prevent sediment delivery to streams.	X	X	X	X	X			X	X	X	X	X					
11	When possible, direct any concentrated runoff from bare soil areas into natural buffers of vegetation or to gentler sloping areas where sediment can settle out.	X							X		X							
12	Dewater active gullies to prevent their enlargement and to reduce their capacity for sediment transport.	X									X							
13	Dewater old gullies, even if they are not actively eroding, so they no longer carry fine sediment to streams.	X									X							
14	Prevent accelerated landsliding by avoiding, minimizing or eliminating future sidecasting on steep or streamside hillslopes.				X	X					X			X				
15	When possible, divert surface runoff and subsurface drainage to stable sites away from steep, unstable or potentially unstable slopes.				X	X					X							
16	Fit shotgun culvert (culverts with outlets above grade) outlets with downspouts or energy dissipation. When reconstructing culverts, also set the slope of the culvert to match the grade of the streambed.	X						X										
17	Maintain culvert inlets, outlet, and bottom in open and sound condition.							X	X									
18	Identify storm drain inlets, manholes, and watercourses before beginning work. If there is any risk of discharge of sediment or road-related material, protect storm drains with appropriate erosion control and sediment management avoidance and minimization measures. Avoidance and minimization measures described in Conditions 4 and 5 will be applied as appropriate.	X							X									
19	Dispose of all excess materials from paved road maintenance activities at designated sites consistent with spoil disposal and stockpile requirements for various materials. Recycle excess materials.								X									

	Avoidance and Minimization Measures	Sediment Management and Erosion Control							Road Maintenance									
		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
20	Avoid sidecasting of soil in all cases where it could be delivered into a watercourse, riparian area, roadside ditch or storm drain. Do not sidecast at all if the slope is sparsely vegetated and it appears that sediment will travel with rain runoff into a stream or estuary system.		X		X	X	X							X				
21	Temporary spoils stockpiles should be located in areas that are relatively level; relatively free of vegetation and away from streams and wetlands areas.	X		X		X			X					X				
22	Remove temporary stockpiles to permanent disposal locations before the rainy season.	X		X		X			X					X				
23	Do not leave loose soil piled in berms alongside the road or ditch. Loose or exposed soil berms are erodible and readily flushed into waterways and storm drains.	X		X					X	X	X			X				
24	If any berm is left in place it must be compacted and stabilized with seeding or asphalt. Frequent well placed breaks in the berms are necessary to allow water to drain from road, preserving the natural drainage pattern of the slope.	X		X														
25	Avoid concentrating sidecasting repeatedly in the same place. Never sidecast large amounts of soil from major landslides.										X			X				
26	In general, maintain unpaved roads to obtain a less erosive running surface and to minimize the need for frequent surface grading. Blade and compact a smooth surface and compact loose soils as needed.										X							
27	Do not apply chemical dust palliatives during rain or immediately before anticipated rain. Approved dust control agents are preferred over water drafting and application.																X	
28	Do not apply chemical or petroleum-based palliatives where they may enter a stream or watercourse unless specifically approved for such use.																X	

	Avoidance and Minimization Measures	Sediment Management and Erosion Control							Road Maintenance									
		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
29	Avoid disturbance of vegetation outside the essential shoulder area, especially near ditches, streams or watercourses. These vegetated areas help filter sediment from water run-off into ditches or streams and helps prevent erosion.	X							X							X		
30	Grade ditches only when necessary to keep the ditchline free flowing and restore capacity. Unnecessary mechanical grading can cause excess erosion, undermine banks, and expose the toe of the cutslope to erosion or slope failure.											X	X					
31	To control vegetation (rather than remove it entirely), use methods like mowing or weed-whacking when feasible. Vegetation prevents scour and filters out sediment.		X						X			X				X		
32	Whenever feasible, maintain a buffer of vegetation between the ditch and the road. This helps filter sediment from runoff and can be accomplished by using a steeper angle on the grader blade.	X	X						X			X				X		
33	Avoid harming existing vegetation on the cutbank above the ditch to reduce erosion and prevent slope failure.	X	X				X		X			X						
34	When “pulling” a ditch (mechanically grading and removing fine sediment), when possible, avoid spreading ditch spoils across or into the surface rock of the road or shoulder. Consider incorporating the removed soil into localized infrastructure (e.g., trails) and compact soil in place.											X						
35	The recommended minimum diameter for all new culverts, including cross drains, but exclusive of driveway culverts, is 18 inches. Often, small diameter culverts (12 inches or less) plug with debris, causing significant road damage. They are also difficult to clean out.	X						X	X				X					

Table 6-4. Continued

	Avoidance and Minimization Measures	Sediment Management and Erosion Control							Road Maintenance									
		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
36	New culverts on anadromous fish bearing streams will be sized for the 100-year storm event. When replacing smaller existing culverts on anadromous fish bearing streams, and space does not allow for a 100-year storm event culvert without creating excessive disturbance (e.g., additional excavation) culverts will be sized as close to 100-year storm event as possible given site constraints.	X						X										
37	Implement energy dissipation avoidance and minimization measures at cross drain outlets to prevent erosion. Discharges from cross drains onto road fill or other erosive areas often cause significant erosion and slope failure. Make sure that newly-installed cross drains are properly designed to minimize erosion problems. Where erosion is already occurring, work to halt and reverse it with appropriate erosion control avoidance and minimization measures. Avoidance and minimization measures described in Conditions 4 and 5 will be applied as appropriate.	X						X	X				X					
38	Clean cross drains as needed; including clearing vegetation and sediment immediately upslope or downslope of the drain if needed.							X	X				X					
39	Inspect equipment for leaks or damage prior to performing concrete work. Perform maintenance at designated repair facilities.																	X
40	Prior to concrete work, identify storm drain inlets, manholes, and watercourses. Protect storm drains with appropriate sediment management avoidance and minimization measures. Avoidance and minimization measures described in Conditions 4 and 5 will be applied as appropriate.																	X

	Avoidance and Minimization Measures	Sediment Management and Erosion Control							Road Maintenance									
		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
41	Designate areas to be used for concrete washout and perform washout only in properly constructed containments. When washing equipment or vehicles to remove cement or concrete residue, use only as much water as is needed so that rinse water can be properly contained. For example, use a positive shutoff on the washout hose.																	X
42	Follow these procedures for concrete mixing on site. - Ensure that contractors who fuel and operate cement mixing operations on site have an adequate spill plan and materials for spill containment. - Avoid mixing excess amounts of fresh concrete or cement on site. - Establish mixing plants outside of riparian corridors or near watercourses. - Dry and wet materials should be stored away from waterways and storm drains and should be covered and contained to prevent runoff from rainfall.																	X
43	Remove concrete grindings, rubble, and debris from the site for proper disposal and do not discharge into drain inlets, the storm water drainage system or watercourses.																	X
44	Contain coolant water from concrete cutting and do not discharge into drain inlets, the storm water drainage system or watercourses.																	X
45	When fresh concrete may be exposed to water, (e.g. rainy weather work), use concrete sealants that are approved by the California Department of Fish and Game for this purpose.																	X
46	Perform all in-stream work in dry conditions, and do not work in flowing waters. If a stream is flowing, use a cofferdam or other dewatering avoidance and minimization measures as needed. See Condition 4 for dewatering avoidance and minimization measures.	X						X	X				X					

	Avoidance and Minimization Measures	Sediment Management and Erosion Control							Road Maintenance									
		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
47	Identify and map existing permanent disposal sites that can be used for long-term disposal of materials from routine and emergency maintenance activities and provide this information to maintenance crews. These sites should be in upland areas, such as rock pits, ridges, and benches. Locations should be above the 100-year floodplain of the closest stream and away from any groundwater seeps or wetlands.			X	X				X									
48	Minimize disturbance of ground cover or grass on the shoulder to the extent possible (the shoulder is part of the road right-of-way and may need to be kept clear for safety purposes), near ditches and outside of the road right-of-way. If the ground is bladed clean during mowing, the exposed soil will be vulnerable to erosion and could run-off into a creek. Vegetation can also act as a pollution filter that traps sediment and other runoff before it gets into ditches or streams.															X		
49	General guidelines for working within the road right-of-way: - Do not mow beyond 8 feet from the edge of the pavement unless that vegetation must be removed to retain existing drainage patterns or for safety reasons. - Do not remove brush more than 20 feet on either side of the road at bridge structures, unless additional removal is required to address safety concerns or to control noxious weeds. - Do not remove brush more than 10 feet on either side of a culvert, or 10 feet up and downstream from culverts that are 6-feet in diameter or larger, unless management is required for safety concerns or to control noxious weeds. NOTE: Fire management requirements must be considered when using this avoidance and minimization measure.							X	X	X						X		

	Avoidance and Minimization Measures	Sediment Management and Erosion Control							Road Maintenance									
		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
50	Small quantities of cut brush and trees may be left in riparian areas, adjacent to streams, when cut vegetation: - Does not cause a safety concern or fire hazard; - Does not disturb existing drainage patterns. - Does not contain noxious weeds (consult with appropriate staff about types and locations of noxious weeds); - Is not stockpiled in concentrated areas that can release leachate to surface water.															X		
51	When removing invasive plants and noxious weeds, use complete and thorough treatments. (*Arundo donax* is particularly difficult and requires at least two treatments to remove all underground root networks.)															X		
52	Dispose of larger amounts of vegetation and debris in approved upland disposal areas. Do not dispose of vegetation directly into waterbodies such as streams or wetlands. Do not permanently dispose of concentrated amounts of vegetation that can generate leachate that could affect surface or groundwater quality, unless disposal is at a location permitted for this purpose.															X		

Table 6-5. Habitat for Covered Species Avoided due to the Stream and Riparian Setback Condition

Species/Modeled Habitat	Total Modeled Habitat in Study Area[1]	Amount in Open Space Types 1, 2, and 3[2]	Commitment to Acquire Modeled Habitat for Reserve System[1]	Additional Modeled Habitat Avoided due to Setbacks[3]	Percent of Modeled Habitat Avoided due to Setbacks
California red-legged frog					
Primary habitat (acres)	10,101	3,230	1,300	2,855	28%
Foothill yellow-legged frog					
Primary habitat (miles)	244	70	30	119	49%
Secondary habitat (miles)	447	1526	50	229	51%
Western pond turtle					
Primary habitat (acres)	82,895	28,568	7,000	13,480	16%
Least Bell's vireo					
Primary habitat (acres)	3,097	330	460	837	55%

Notes:
[1] Source: **Table 5-17**.
[2] Open space Types 1, 2, and 3 are assumed to provide some conservation value for covered species.
[3] Excludes setbacks that could occur within the Reserve System and existing open space. Represents a reasonable estimate of avoidance during the permit term if all covered activities occurred. Estimate does not include setbacks from rural residential development, which are difficult to predict in locations precise enough to estimate setback distances.

Table 6-6. Recommended Setbacks to Preserve Riparian and Stream Function (from studies throughout the United States since 1990)

	Function	Citation	Recommended Setback
Physical Properties	**Sediment and Nutrient Reduction**	Corley et al. 1999	>33 feet
		Nichols et al. 1998	>60 feet
		Woodward and Rock 1995	>50 feet
		Desbonnet et al. 1994	80 feet
		Petersen et al. 1992	>33 feet
		Castelle et al. 1992	>50 feet
		Schellinger and Clausen 1992	75 feet
		Welsch 1991	>85 feet
	Removal of Fecal Coliform	Johnson and Ryba 1992*	75–300 feet
	Moderation of Stream Temperature/Microclimate	Lynch and Corbett 1990	100 feet
	Channel Complexity	Brosofske et al. 1997	>145 feet
		Chapel et al. 1991	135–220 feet
Biological Properties	**Salmonid Habitat**	Ligon et al. 1999	>150 feet
		Welsch 1991	>85 feet
	Reptile/Amphibian Habitat	Burbink et al. 1998	>325 feet
		Semlitsch 1998	540 feet
		Buhlmann 1998	440 feet
		Rudolph and Dickson 1990	98 feet
	Bird Habitat/Diversity	RHJV 2000	250 feet
		Whitaker and Montevechi 1999	>160 feet
		Hagar 1999	>130 feet
		Kilgo et al. 1998	>1,600 feet
		Richardson and Miller 1997	>160 feet
		Mitchell 1996	>325 feet
		Hodges and Krementz 1996	>325 feet
		Spackman and Hughes 1995	450 feet for 90% of species diversity
	Mammal Habitat/Diversity	Hilty et al. 2006	>1,000 feet
	Plant Diversity	Spackman and Hughes 1995	30–100 feet for 90% of species
	General Riparian/Ecosystem Function	NH FSSWT 2000	100 feet, 300 feet, 600 feet by stream order
		Spence et al. 1996	98–145 feet
		Johnson and Ryba 1992*	> 98 feet
		Chapel et al. 1991	160–650 feet
		Welsch 1991	>85 feet

* Article does not present new data, but instead is a review of existing data.

Table 6-7. Required Stream Setback Distances[1]

Stream Category	Category 1 Streams		
Slope Class	Inside Existing Urban Service Area[2]	Outside Existing Urban Service Area[2]	Category 2 Streams
0–30%	100 feet	150 feet	35 feet
> 30%	150 feet	200 feet	

[1] All distances measured from top of bank. For Category 1 streams, if the edge of riparian vegetation extends beyond setback, the riparian edge becomes the setback plus a 35-foot buffer from riparian edge inside or outside the Urban Service Area. For Category 2 streams, if the site supports riparian vegetation, the setback will extend from the riparian edge plus a 35-foot buffer.

[2] Urban service areas existing at the time of permit issuance for the Habitat Plan.

Table 6-8. Summary of Habitat Survey Requirements and Preconstruction Survey and Monitoring for Select Covered Wildlife Species

			Requirements			
Land Cover Type	Species	Specific Habitat Elements	Species Habitat Survey[1]	Preconstruction Survey	Avoidance and Minimization Requirements	Construction Monitoring
Any Grassland, Oak Woodland, or Agricultural Land Cover Types	San Joaquin kit fox	• Within the modeled habitat in the study area (see species account in Appendix D for model and parameters)	• Identify and map potential den sites	• Determine status and map all dens (>5 in. diameter) within 250 feet of activity footprint	• Monitor dens • Destroy unoccupied dens • Discourage use of occupied (non-natal) dens	• Establish exclusion zones (>50 feet) for potential dens • Establish exclusion zones (>100 feet) for known dens • Notify USFWS and CDFG of any occupied natal dens • Construction or maintenance personnel must participate in training
	Western burrowing owl	• Within all occupied nesting habitat (**Figure 5-11**). Surveys are not required in sites that are mapped as potential nesting/overwintering or only overwintering habitat	• Identify and map burrows and potential burrows within 250 ft of activity footprint • Document evidence of presence/absence (owls, pellets, whitewash, prey remains) • Species survey in occupied habitat are required in both breeding and non-breeding	• Conduct burrowing owl survey within 2 calendar days of ground disturbance (see Condition 15 for details of required survey methods)	• Avoid occupied nests within a 250-foot buffer during breeding season (Feb 1–Aug 31) or develop a monitoring plan that allows activity within 250-foot buffer (see Condition 15 for requirements) • Avoid occupied burrows during non-breeding season (Sept 1–Jan 31) or meet requirements in Condition 15 if allowing activity within a 250-foot buffer	• Establish buffer zones (250 feet) around active nests if applicable • Establish buffer zones (250 feet) around occupied burrows during non-breeding season if applicable • Implement construction monitoring consistent with monitoring plan or requirements if activities occur within the buffer • Construction or maintenance personnel must participate in training

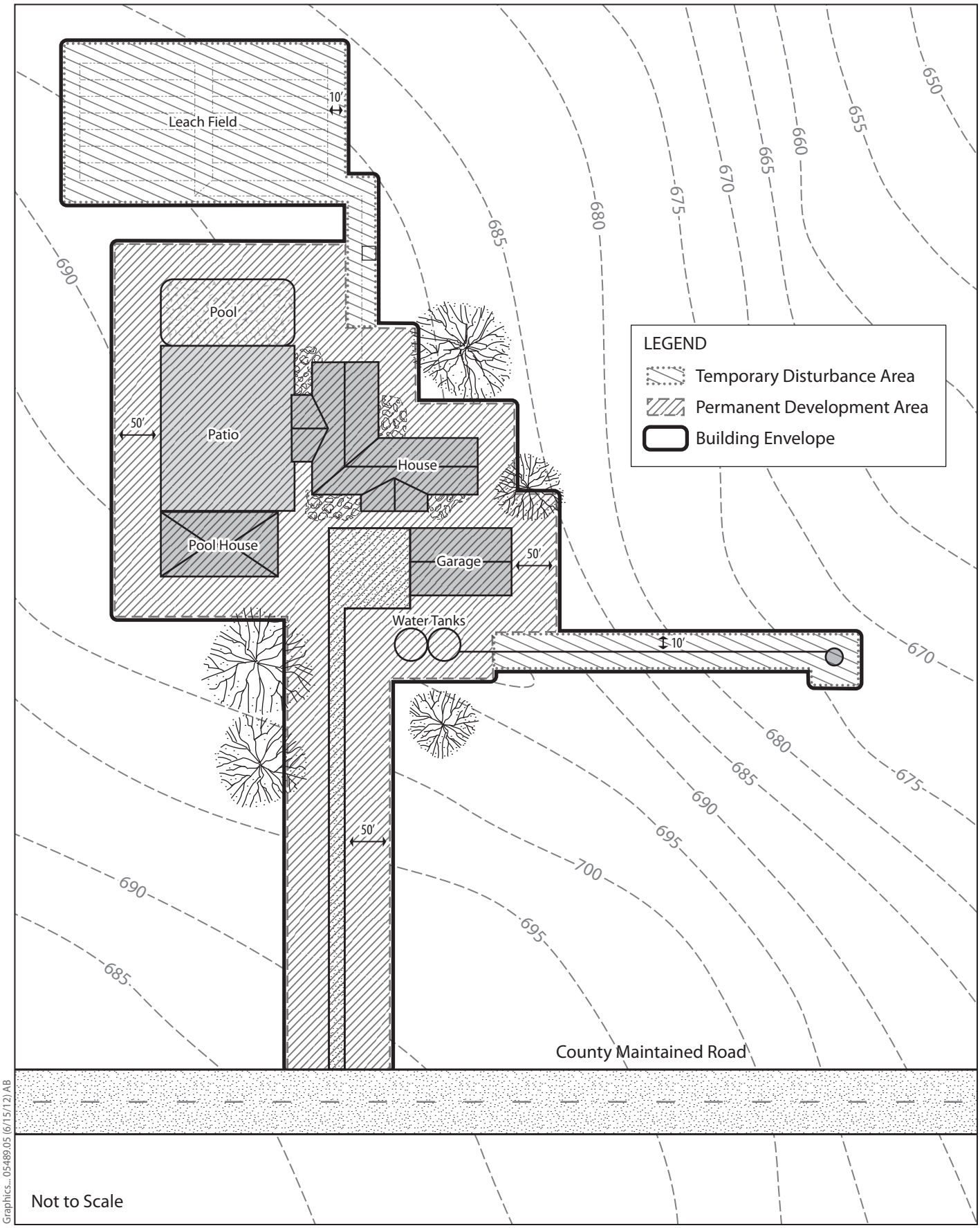
Land Cover Type	Species	Specific Habitat Elements	Requirements: Species Habitat Survey[1]	Requirements: Preconstruction Survey	Requirements: Avoidance and Minimization Requirements	Requirements: Construction Monitoring
Pond or Coastal/ Valley Freshwater Marsh	Tricolored blackbird	• Within 250 feet of verified riparian land, coastal and valley freshwater marsh, or pond cover types	• Identify and map nesting substrate, and marsh habitat	• Document presence/absence of breeding colony within 2 calendar days of disturbance • Document use of habitat (e.g., breeding, foraging) • Determine if the site has been used for nesting in the past 5 years	• Avoid occupied nests colonies during breeding season (Mar 15–July 31) • Avoid nest sites that were occupied in the past 5 years	• Establish 250-foot buffer around outer edge of all hydric vegetation associated with breeding habitat • Construction or maintenance personnel must participate in training • Notify CDFG and USFWS of nest locations immediately
Any Riparian Forest and Scrub Land Cover Types	Least Bell's vireo	• Within potential breeding habitat, as mapped by the Implementing Entity • Within 250 feet of verified riparian land cover types	• Identify and map early successional riparian forest or scrub	• Document presence/absence of nesting least Bell's vireo within 2 calendar days of disturbance • Document use of habitat (e.g., breeding, foraging) • Determine if the site has been used for nesting in the past 3 years	• Avoid occupied nests during breeding season (Mar 15–July 31) • Avoid nest sites that were occupied in the past 3 years	• Establish a 250-foot buffer around occupied nest site • Construction or maintenance personnel must participate in training • Notify CDFG and USFWS of nest locations immediately
Serpentine bunchgrass grassland	Bay checkerspot butterfly	• In Bay checkerspot butterfly habitat units identified in Appendix D • In mapped serpentine that cannot be avoided	• Identify and map extent of larval host plants • Report results of reconnaissance level surveys for adult butterflies	• None	• Locate the project footprint as far from field-verified occupied Bay checkerspot habitat or the highest-quality serpentine habitat as feasible	• None

[1] Changes to project design that result from planning survey information will help avoid impacts to covered species. If no project design changes are needed and site is relatively simple, species habitat surveys could be combined with preconstruction surveys.

Table 6-9. Survey Periods for Covered Plant Species

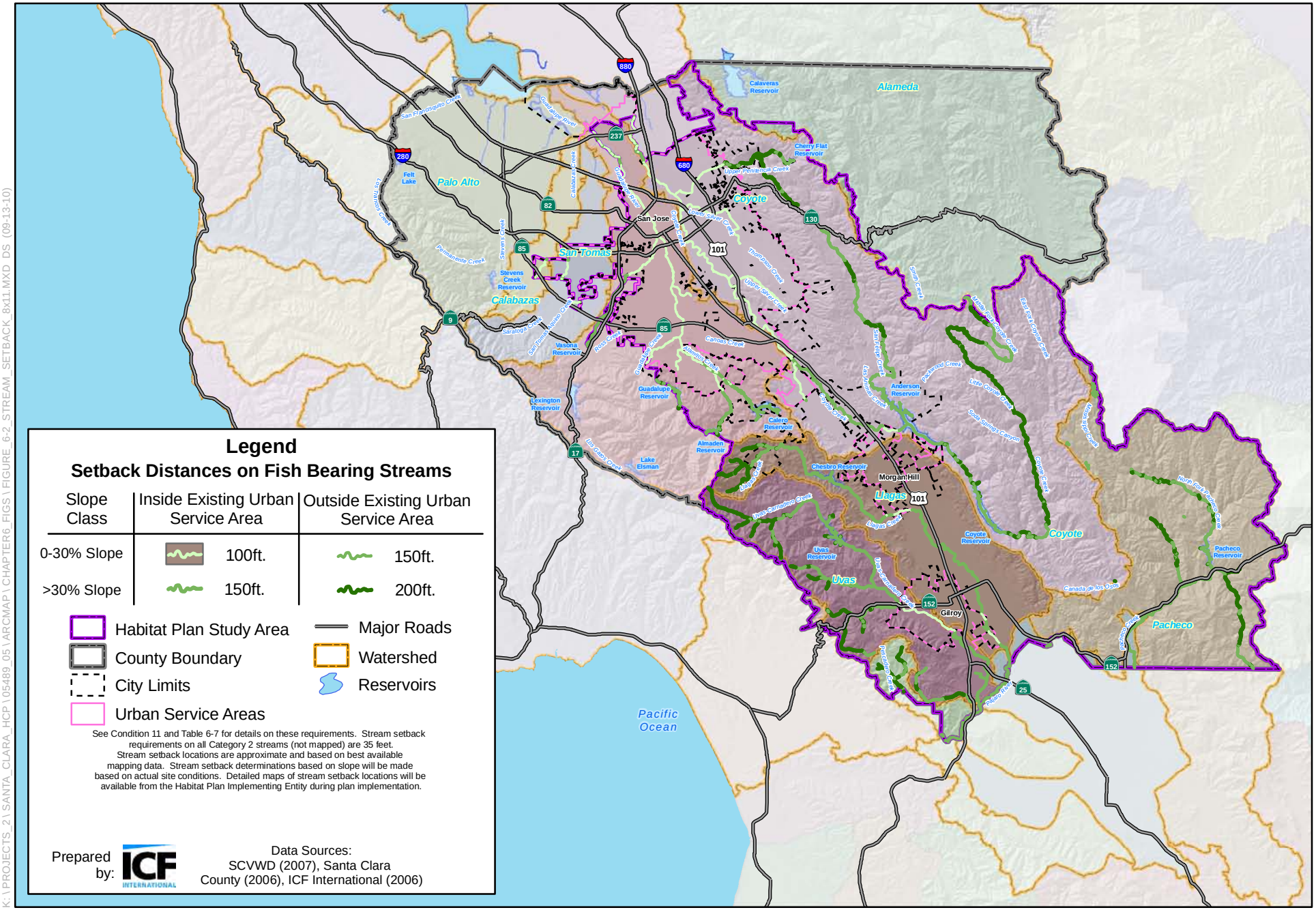
Species		Survey Period											
Common Name	Scientific Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Covered Species													
Tiburon Indian paintbrush	*Castilleja affinis* ssp. *neglecta*				√	√	√	√					
Coyote ceanothus	*Ceanothus ferrisiae*	√	√	√	√	√							
Mount Hamilton thistle	*Cirsium fontinale* var. *campylon*		(√)	(√)	√	√	√	√	√	√	(√)		
Santa Clara Valley dudleya	*Dudleya abramsii* ssp. *setchellii*				√	√	√						
Fragrant fritillary	*Fritillaria liliacea*		√	√	√								
Loma Prieta hoita	*Hoita strobilina*					(√)	√	√	(√)	(√)	(√)		
Smooth lessingia	*Lessingia micradenia* var. *glabrata*							√	√	√	(√)	(√)	
Metcalf Canyon jewelflower	*Streptanthus albidus* ssp. *albidus*				√	√	√	√					
Most beautiful jewelflower	*Streptanthus albidus* ssp. *peramoenus*			√	√	√	√						

Note: (√) indicates flowering periods which are possible but uncommon for the species.



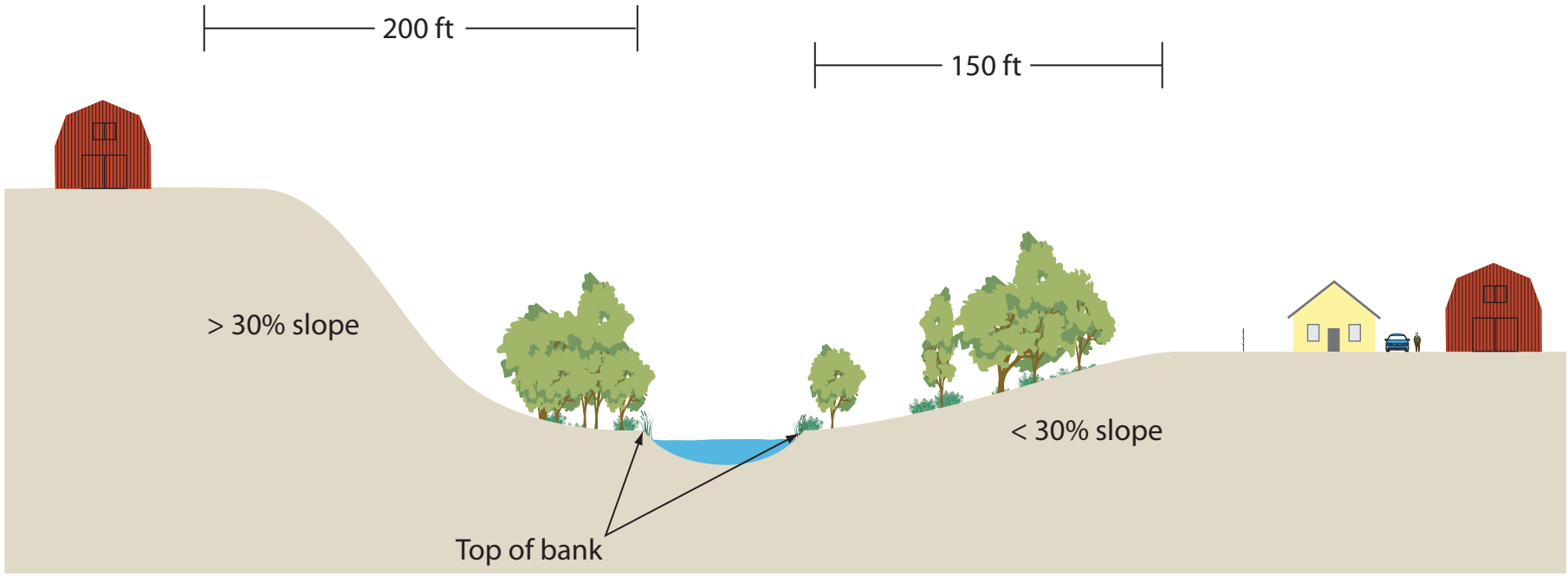
Graphics... 05489.05 (6/15/12) AB

Figure 6-1
Schematic for Calculating Development Area



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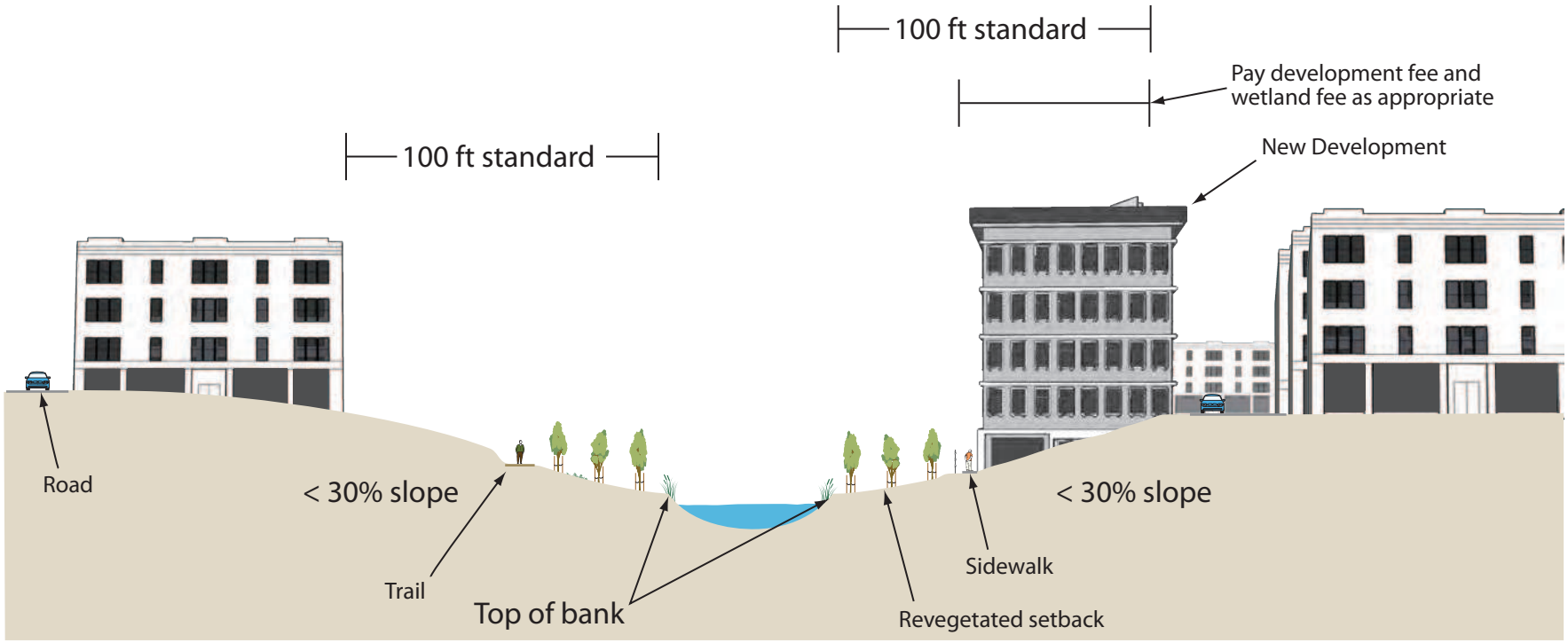
Figure 6-2
Stream Setback Requirements for Category 1 Streams



Not to Scale

Graphics... 05489.05 HCP (6/15/12) AB

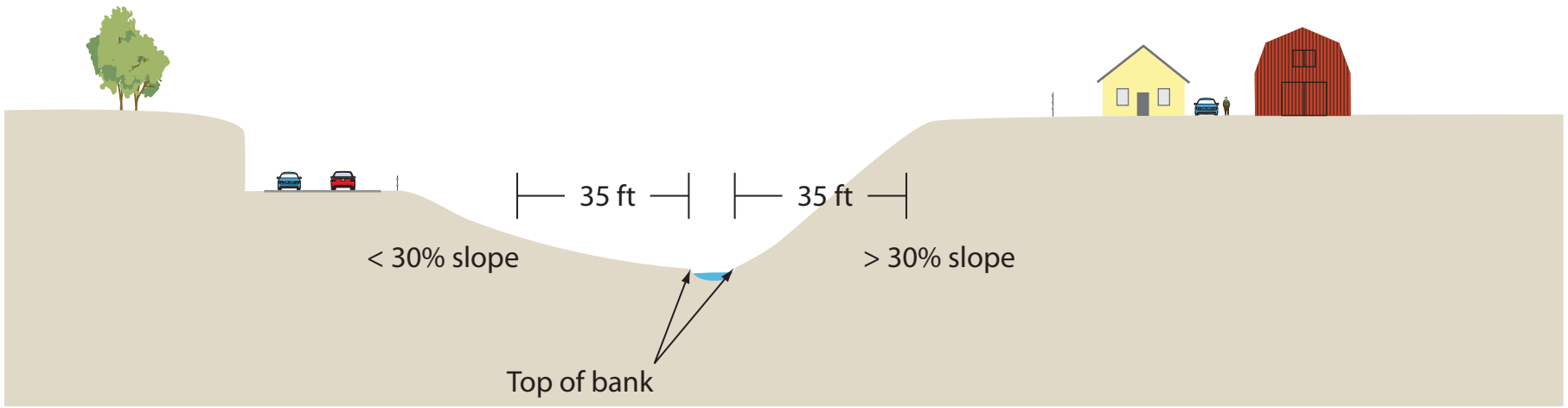
Figure 6-3a
Stream Setback Condition – Slope Examples
Category 1 Stream Outside Urban Service Area



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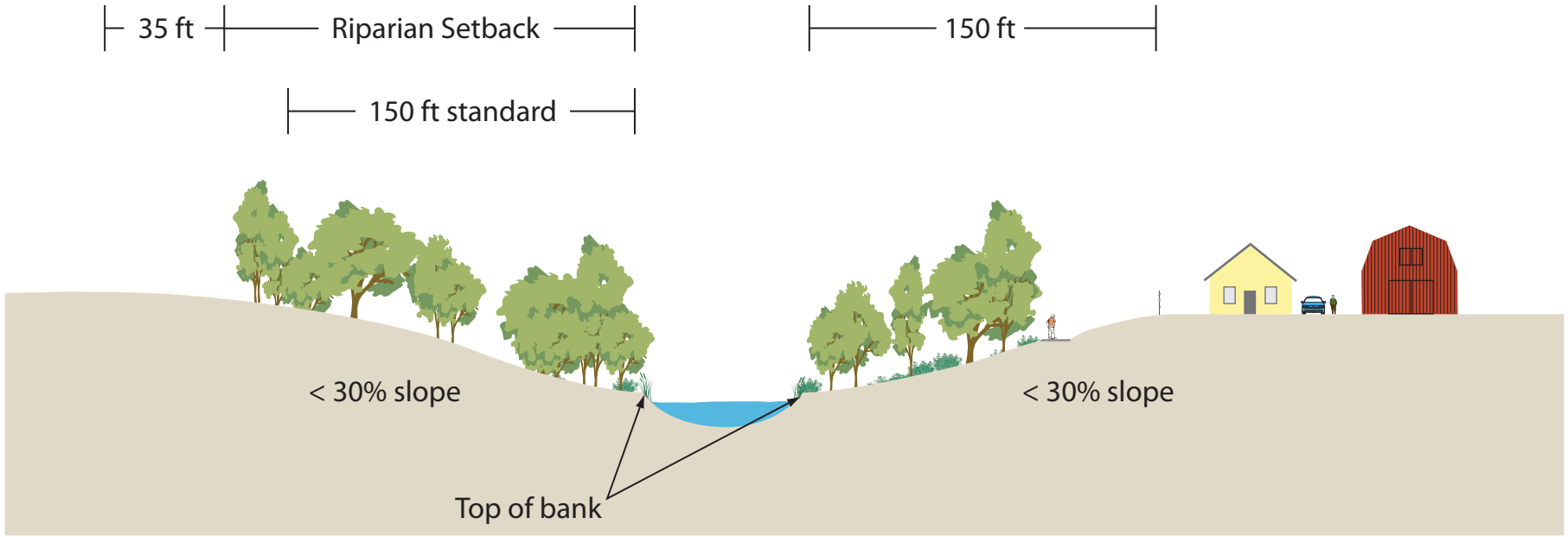
Figure 6-3b
Stream Setback Condition
Category 1 Inside Urban Sevice Area



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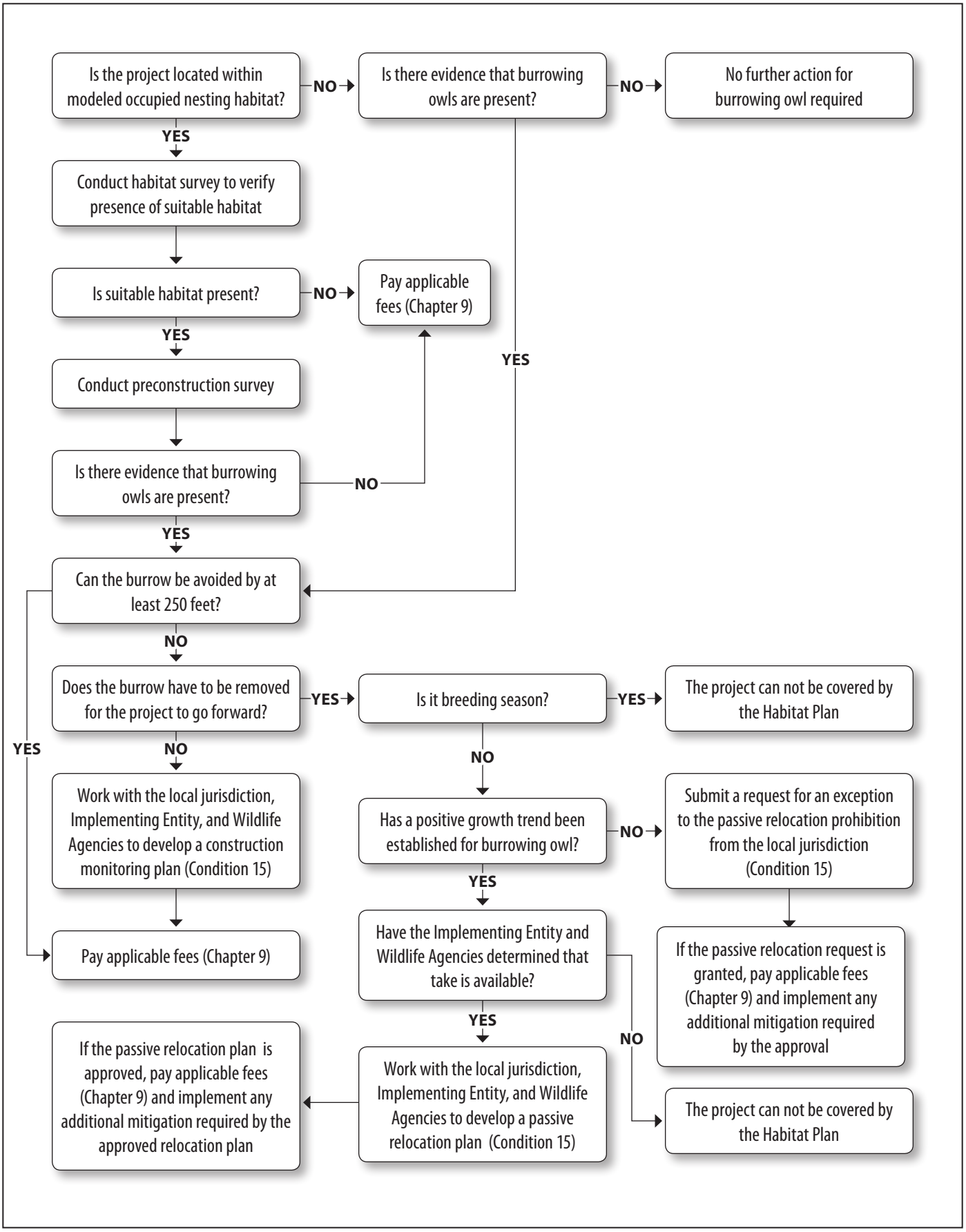
Figure 6-3c
Stream Setback Condition – Ephemeral Stream (Category 2) Example



Not to Scale

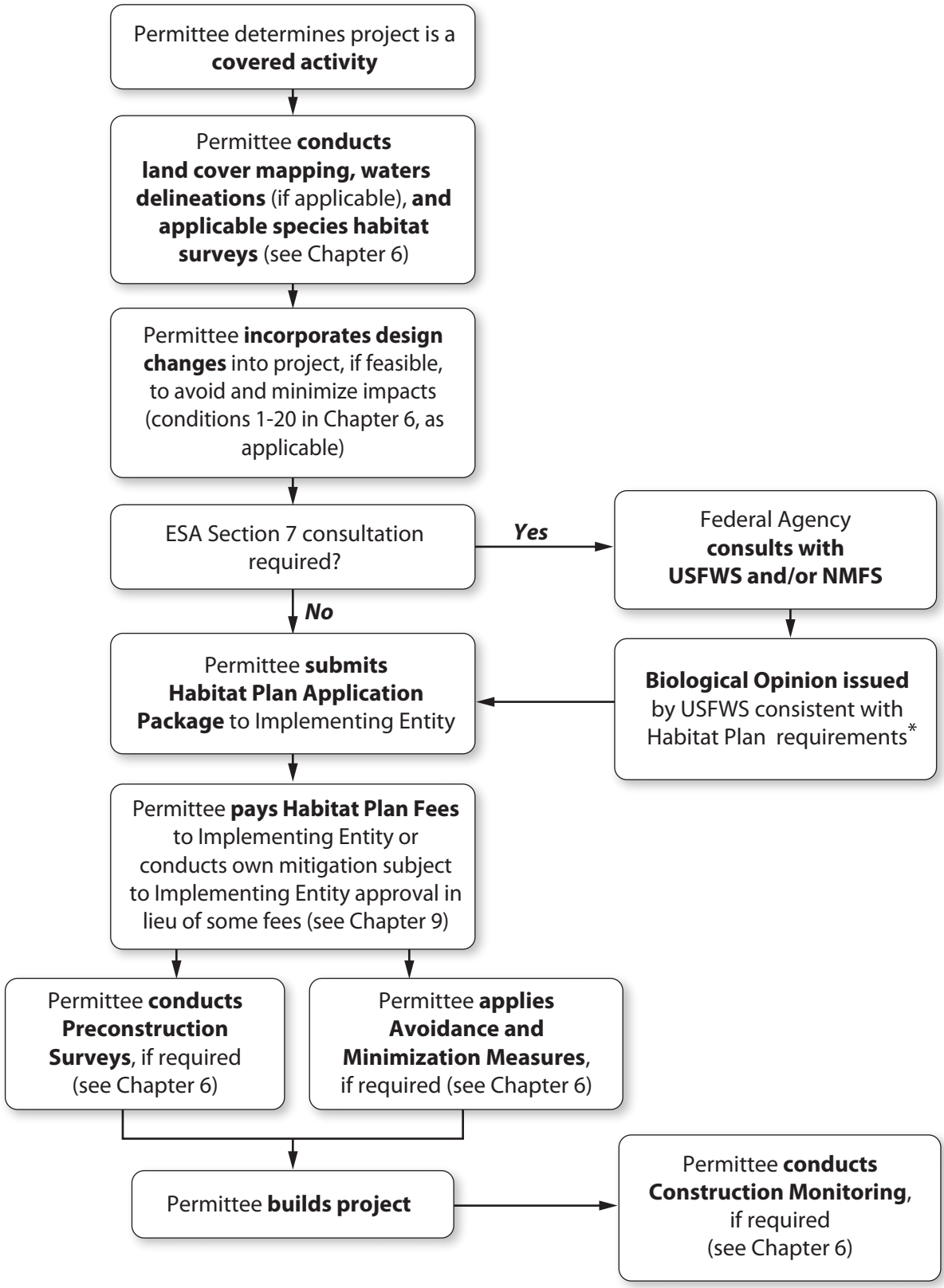
Graphics... 05489.05 HCP (6/15/12) AB

Figure 6-3d
Stream Setback Condition – Riparian Vegetation Examples
Category 1 Stream Outside Urban Service Area



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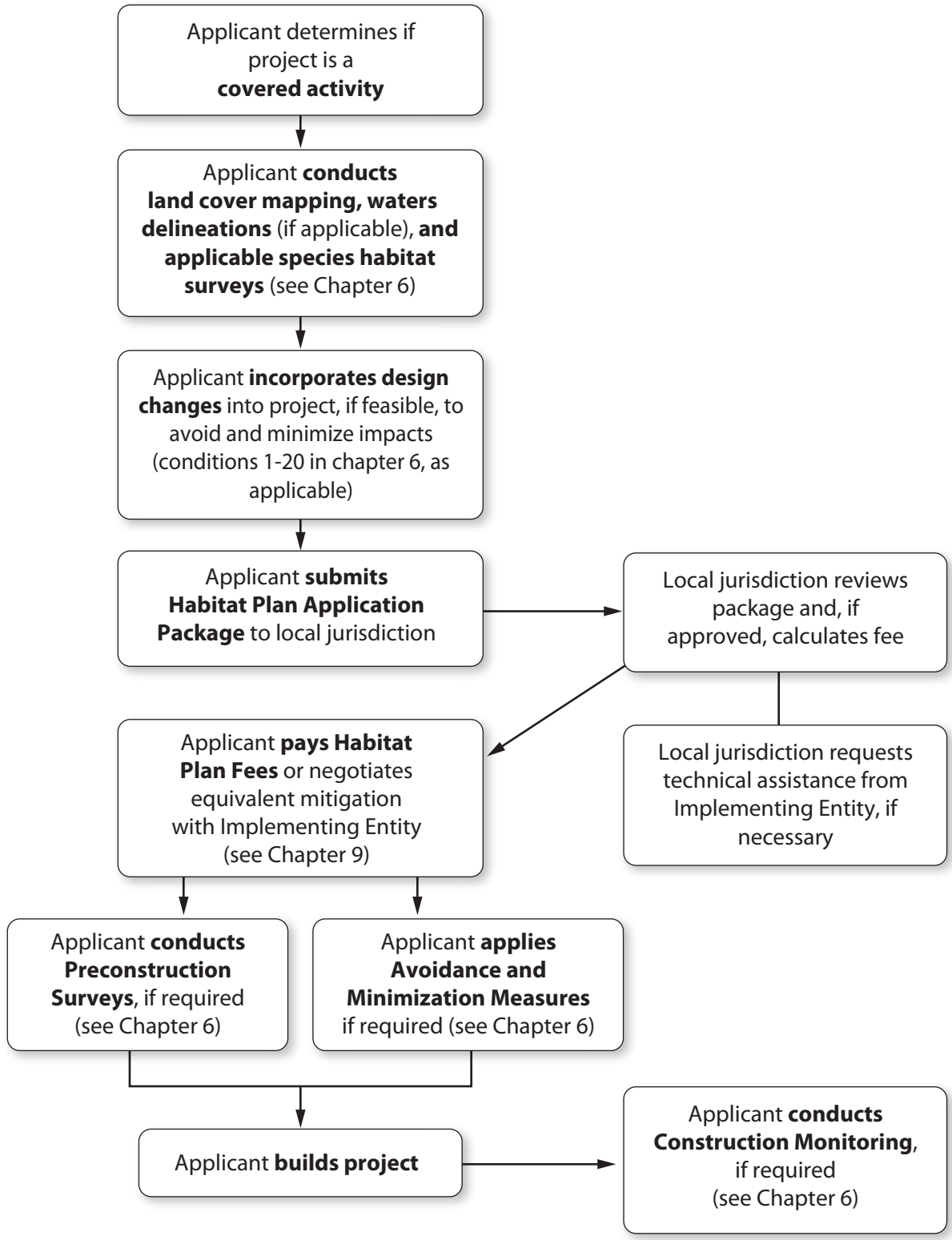
Figure 6-4
Western Burrowing Owl Survey and Monitoring Requirements Flow Chart



* Other permits may require different mitigation than required by the Habitat Plan.

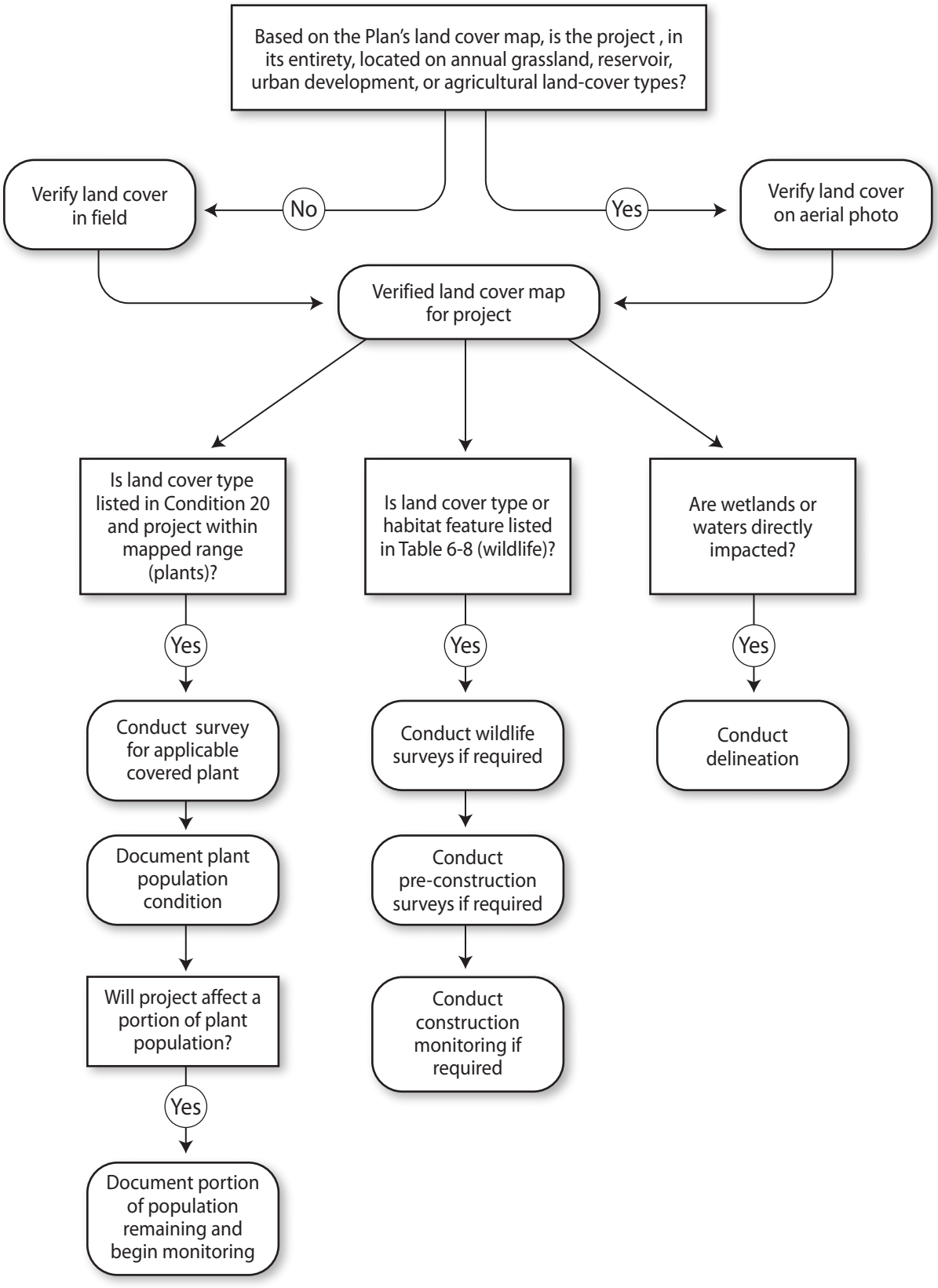
Graphics...05489.05 (03-12) AB

Figure 6-5
Process for Project Compliance with Habitat Plan for Public Projects (by Permittees)



Graphics... 05489.05 (03-12) AB

Figure 6-6
Process for Project Approval under Habitat Plan for Private Projects Covered by Plan

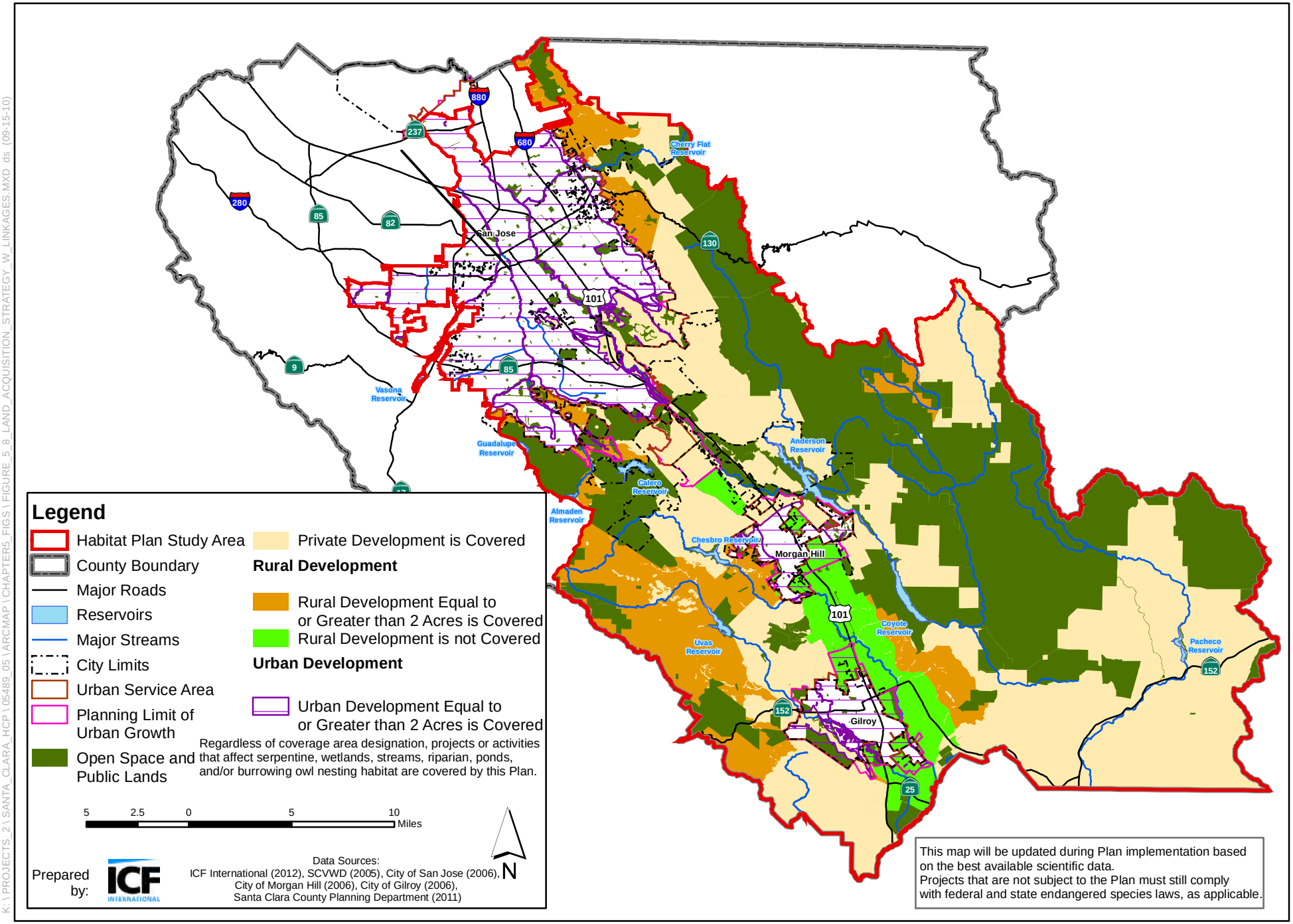


Note: If "no" action is not specified, then no action is required.

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Figure 6-7
Survey Requirements for Covered Activities



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Figure 6-8
Private Development Areas Subject to the Plan

C.6 Almaden Lake Preliminary Delineation of Waters of the United States

ESA

ALMADEN LAKE PROJECT

Preliminary Delineation of Waters of the United States, Santa Clara County, California

Prepared for
Santa Clara Valley Water District

July 2016



ALMADEN LAKE PROJECT

Preliminary Delineation of Waters of the United States, Alameda County, California

Prepared for
Santa Clara Valley Water District

July 2016

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130679.00

TABLE OF CONTENTS

Preliminary Delineation of Waters of the U.S., Almaden Lake Project

		Page
1	**Introduction**	**1**
	1.1 Objective	1
	1.2 Summary of Results	1
	1.3 Responsible Parties	3
	1.4 Project Description	3
2	**Setting**	**5**
	2.1 Delineation Study Areas	5
	2.2 Soils	7
	2.3 Hydrology	7
	2.4 Vegetation	8
3	**Methods**	**9**
	3.1 Definitions	9
	3.2 Regulatory Setting	11
	3.3 Office Preparation	13
	3.4 Field Survey Methods	13
4	**Results**	**15**
	4.1 Results	15
	4.2 Clean Water Act Analysis	20
5	**Report Preparation and References**	**23**
	5.1 Report Preparation	23
	5.2 References and Sources Consulted	23

Appendices

A.	Delineation Maps	A-1
B.	Wetland Datasheets	B-1
C.	Jurisdictional Determination Analysis Map	C-1
D.	NRCS Soils Report	D-1
E.	WETS Tables for San Jose, Santa Clara County	E-1
F.	Representative Photographs	F-1

List of Figures

1.	Project Location Map	2
2.	Project Area Map	6

List of Tables

4-1	Potentially Jurisdictional Wetlands and Waters of the U.S.	16

ACRONYMS AND ABBREVIATIONS USED IN THIS DOCUMENT

CFR	Code of Federal Regulations
CWA	Clean Water Act
EPA	United States Environmental Protection Agency
FAC	Facultative plant species
FACU	Facultative upland plant species
FACW	Facultative wetland plant species
GIS	Geographic Information System
GPS	Global Positioning System
ISW	Instream Wetland
OBL	Obligate wetland plant species
OHWM	Ordinary high water mark
NI	No wetland indicator assigned (for plants)
NRCS	Natural Resource Conservation Service
NRPW	Non-relatively permanent waters
RPW	Relatively permanent waters
SWANCC	Solid Waste Agency of Northern Cook County
TNW	Traditionally navigable waters
UPL	Upland plant species
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service

CHAPTER 1
Introduction

1.1 Objective

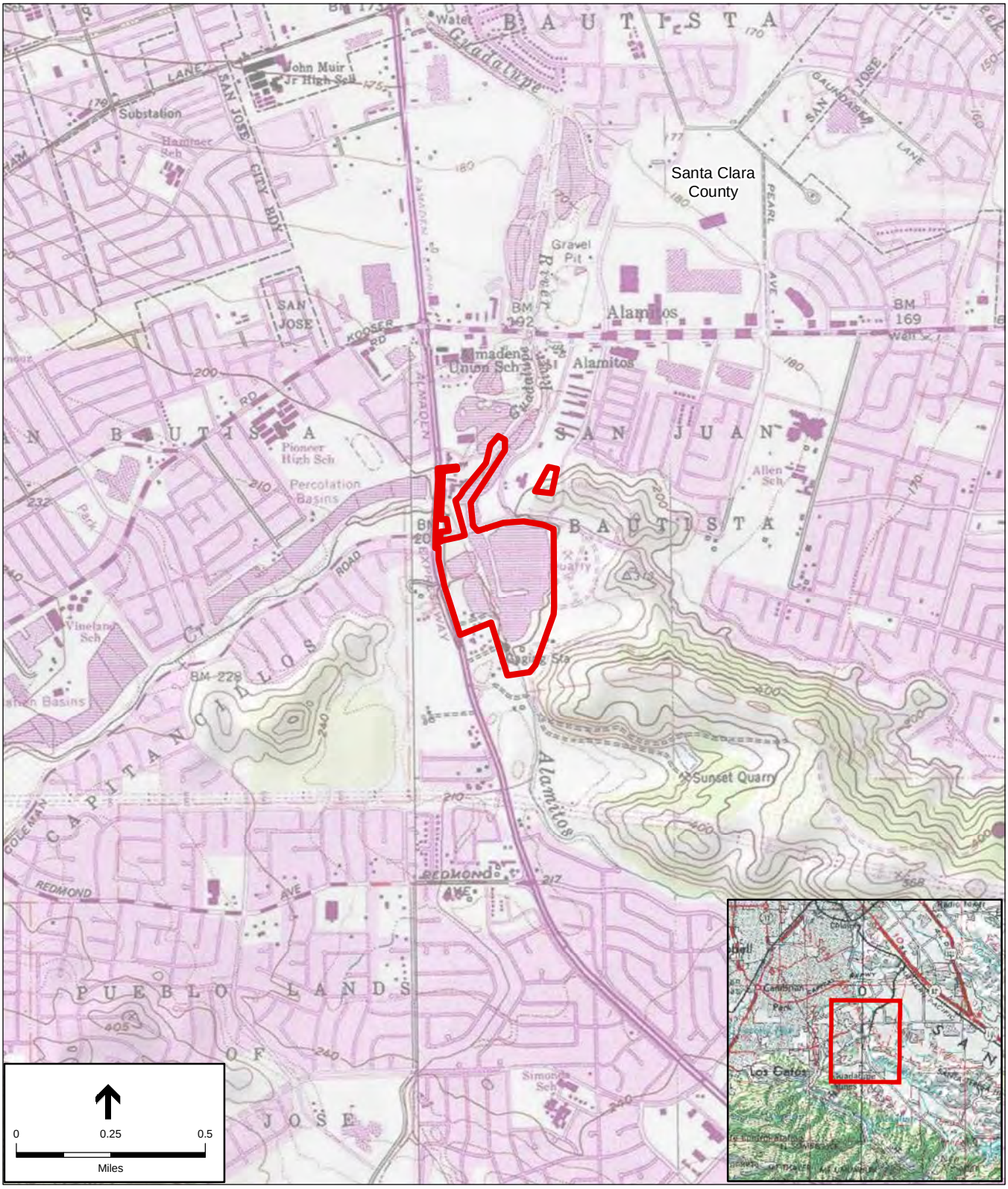
This report documents the extent of potentially jurisdictional waters of the United States, including wetlands and other waters, which occur at the Almaden Lake Project site. The project site is located in Santa Clara County, California, in and adjacent to Almaden Lake, within the City of San Jose (**Figure 1**).

The purpose of this document is to identify features within the project study areas under potential jurisdiction of the U.S. Army Corps of Engineers (USACE), and to provide the background information necessary to support a future permit application under Section 404 and Section 401 of the Clean Water Act for the proposed maintenance activities. This assessment is based on the best professional judgment of ESA investigators. All conclusions presented should be considered preliminary and subject to change pending official review and verification in writing by USACE.

1.2 Summary of Results

ESA conducted a formal wetland delineation of the study area on December 1, 2015 and May 24, 2016. The field delineation identified and documented all potentially jurisdictional wetlands and other waters of the U.S. within the delineation study area. A total of 37.12 acres (1,617,022 square feet) of potentially jurisdictional waters of the U.S. occur within the delineation study area which includes Alamitos Creek, Almaden Lake, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond. The total area includes: 0.46 acre (20,189 square feet) of freshwater marsh (lake shore), 0.23 acre (9,957 square feet) of willow scrub/freshwater marsh (instream wetlands), 2.11 acres (91,774 square feet) freshwater marsh (instream wetlands), and 34.32 acres (1,495,101 square feet) of other waters. A total of 2,062 linear feet of potentially jurisdictional waters of the U.S. occur within the creek and river segments in the delineation study area.

A detailed summary of jurisdictional features documented within the delineation study area is presented in Table 4-1 (Chapter 4). A delineation map of the study area is presented in **Appendix A**; wetland datasheets are provided in **Appendix B**; a Jurisdictional Determination Analysis map, showing the project site's connection to Traditionally Navigable Waters, is located in **Appendix C**; a soils map for the study area is provided in **Appendix D**; the climate summary (WETS Table) information table for San Jose, CA is provided in **Appendix E**; and representative photographs are provided in **Appendix F**.



SOURCE: USGS Santa Teresa Hills, Calif. 7.5-minute topographic quadrangle

Almaden Lake Project . 130679

Figure 1
Project Location

1.3 Responsible Parties

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Contact: Michael Martin, Environmental Planner
MichaelMartin@valleywater.org
(408) 630-3095

1.4 Project Description

The District proposes two alternatives to address methylmercury production and water quality concerns in Almaden Lake, and to reduce barriers to the passage of anadromous fish within the project area. To restore the creek, both alternatives would isolate approximately 1,600 feet of Alamitos Creek in a channel that would be separated from Almaden Lake by a new 40 feet wide levee. The levee would separate the creek from the lake, and would serve as a maintenance road and public trail. To restore the lake, its bed would be leveled and the existing mercury-laden sediment would be capped with a layer of clay/levee fill material. The high water lake level of 190 feet above msl would be maintained under both alternatives by sourcing either (1) from the available water in Alamitos Creek, or (2) from available recycled water from a future extension of the San Jose Water Company Recycled Water system pipeline along Winfield Boulevard. Other improvements proposed under both alternatives include the expansion of the existing island to 0.75 acre, construction of a new 0.75 acre island, and expansion of open park area by up to 2 acres, into the existing west beach and lake area. After construction, riparian vegetation, would be installed along the sides of the new levee, the west bank of the proposed creek, and the islands.

Under Alternative 1, Alamitos Creek and Almaden Lake would have a water surface of 10 acres and 19 acres, respectively. Within the west shore of the existing lake near Coleman Road, 0.3 acres would be cut/excavated, and 1.1 acres of open water along the existing beach area would be filled to increase the new Park area (SCVWD, 2015c). Under Alternative 2, Alamitos Creek and Almaden Lake would have a water surface of 11 acres and 17 acres, respectively. Within the shore of the existing lake near Coleman Road, little to no Park land would be excavated, and 1.6 acres along the existing beach area would be filled to increase the new Park area (SCVWD, 2015d). Furthermore, both alternatives propose relocating the existing boat facility near Coleman Road to the southern shore of the lake on top of the bank of the proposed levee (SCVWD, 2015f).

If desired, the City may construct a new trail on the west side of the lake in the new Park area in the future (SCVWD, 2015b). Construction activities associated with any future trail would undergo a separate environmental impact review from the proposed project, but would beyond the bank of any water feature.

CHAPTER 2
Setting

2.1 Delineation Study Areas

The study area is located in the ecologically diverse Central California Coast Ecological Section, Santa Clara Valley subsection (Miles and Goudey, 1997). The Santa Clara Valley is characterized by rolling hills, alluvial fans and floodplains. Regional natural plant communities include valley oak savanna and grassland, oak woodland, wet meadow, riparian woodlands, and valley freshwater marsh. The climate is temperate with mean annual precipitation of 16 inches and mean annual temperatures ranging from a high of 71 to a low of 50 degrees Fahrenheit (Western Regional Climate Center, 2016).

Alamitos Creek enters Almaden Lake at the south end of the Project Area. Alamitos Creek continues on for a short while after Almaden Lake before meeting Guadalupe Creek and both creeks flow into the Guadalupe River. The Guadalupe River runs north throughout the City of San Jose. Guadalupe River then discharges into Alviso Slough, which is tidally influenced, which then flows into Coyote Creek for a short while before flowing into the San Francisco Bay.

The study area includes all of Almaden Lake, small portions of Alamitos Creek, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond, and two upland staging areas. The project site is located at and near Almaden Lake Park within the City of San Jose (**Figure 2**).



Almaden Lake Project . 130679

Figure 2
Study Area

2.2 Soils

The United States Department of Agriculture (USDA) Naturals Resource Conservation Service (NRCS) Web Soil Survey (USDA NRCS, 2016) was consulted to determine the soil types occurring within the delineation study area. A soils map is included in Appendix D. Several soil types occur within the study area, but most of the area is covered by urban land or water. All soil types are described below, all soil types that are within urban land are described under the urban land section.

Urban Land

Several Urban land complexes are mapped within the study area, all of which contain differing proportions of native, disturbed and human transported material.

- Urban land-Campell complex, 0 to 2 percent slopes, protected: 1.1%
- Urban land-Alumrock-Zepplin complex, 9 to 15 percent slopes: 2.0%
- Urban land-Elpaloalto complex, 0 to 2 percent slopes: 5.1 %
- Urban land-Clear Lake complex, 0.2 percent slopes: 4.0%
- Urban land-Landelspark complex, 0 to 2 percent slopes: 29.3%

Cumulic Haploxerolls

Cumulic Haploxerolls cover 5.8% of the project area and is a soil type within stream channels and terraces. The soil contains very gravelly sandy loam throughout the profile from 0 to 45 inches and is not considered a hydric soil. Cumulic Haploxerolls is comprised of moderately well-drained soil formed in alluvium from metamorphic and sedimentary rock or metavolcanic parent material.

Water

Water is a large portion of the project area (52.8%) because of Almaden Lake, Alamitos Creek, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond.

2.3 Hydrology

Almaden Lake is supplied by Alamitos Creek, which is fed by releases from the Almaden and Calero Reservoirs upstream. Downstream, Almaden Lake discharges Alamitos Creek which quickly meets Guadalupe Creek at the confluence of Guadalupe River. Almaden Lake was created by gravel quarry operations in the 1950's and 1960's. The lake is approximately 40 acres in area, with a maximum depth of 43 feet. Flow and water level in the lake are governed by the water balance of input flows (related to releases from reservoirs) from Alamitos Creek versus discharge out of the lake which is controlled by a flashboard dam across Guadalupe River. The flashboards are usually installed in April and left in place until November or December and during this period, water elevation in the lake rises approximately 5 feet (Horizon, 2013).

Alamitos Creek and the Guadalupe River collect water from within the Guadalupe watershed. The Guadalupe watershed encompasses approximately 170 square miles. The Guadalupe River flows into Alviso Slough which is tidal and ultimately flows to the San Francisco Bay.

A review of aerial photographs (Google Earth, 2016) and a site visit to the study areas in December 2015 indicates that Alamitos Creek and Almaden Lake contains water throughout the year. Late summer and fall flows are driven by reservoir releases, irrigation, and other urban water uses while winter and spring flows are likely driven by stormwater runoff. Water was present in Alamitos Creek and Almaden Lake during the site visit on December 1, 2015. Water levels were clearly low within the Almaden Lake during the site visit due to drought conditions for the last few years. Based on these observations, the stream and lake within the project area is assumed to be a Relatively Permanent Water (RPW).

2.4 Vegetation

Freshwater marsh is the predominant vegetation type within the wetlands in the study area occurring on the fringes of Almaden Lake, Los Alamitos Creek, Guadalupe Creek, and Guadalupe River. It is dominated by herbaceous wetland plants including narrow leaf cattail (*Typha angustifolia*) and hardstem bulrush (*Schoenoplectus acutus*), and woody plants including mule fat (*Baccharis salicifolia*). Uplands also occur directly adjacent to Almaden Lake in some cases or just beyond the freshwater marsh edge. The uplands around Almaden Lake are dominated by non-native mowed grasses including dallis grass (*Paspalum dilatatum*), and contains non-native park trees such as Peruvian pepper tree (*Schinus molle*) and shrubs including coyote brush (*Baccharis pilularis*). Uplands adjacent to Guadalupe River are dominated by wild oat (*Avena fatua*) and other non-native grasses and herbs.

Along Alamitos Creek and Guadalupe Creek, mixed riparian forest occurs from the edge of the creek to the upper banks. The riparian area is dominated by tall trees and some shrubs and herbs including mature California sycamore trees (*Platanus racemosa*), Himalayan blackberry (*Rubus armeniacus*), smilo grass (*Stipa miliacea*), and other non-native and native shrubs, herbs, and grasses. Narrow bands of freshwater emergent wetland/willow scrub also occur along Alamitos Creek and include willow (*Salix* sp.), mugwort (*Artemisia douglasiana*), and fringed willowherb (*Epilobium ciliatum*).

CHAPTER 3
Methods

3.1 Definitions

Many of the terms used throughout this report have specific meanings with respect to the delineation of Waters of the U.S. These terms are defined below:

Waters of the United States: The Code of Federal Regulations (33 CFR § 328.3[a]; 40 CFR § 230.3[s]) defines 'waters of the United States' as:

> (1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (2) All interstate waters including interstate wetlands; (3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce including any such waters which are or could be used by interstate or foreign travelers for recreational or other purposes; or from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or which are used or could be used for industrial purposes by industries in interstate commerce; (4) All impoundments of waters otherwise defined as waters of the United States under the definition; (5) Tributaries of waters identified in paragraphs (1) through (4); (6) Territorial seas; and (7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (1) through (6).

Wetlands: The USACE and the U.S. Environmental Protection Agency (EPA) define wetlands as, "Those areas that are saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for the life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." USACE wetlands must typically exhibit three parameters: 1) wetland hydrology, 2) hydrophytic vegetation, and 3) hydric soils in order to meet the federal definition.

> **Wetland Hydrology:** This term encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. These include both riverine and non-riverine hydrology indicators, such as sediment deposits, drift lines, and oxidized rhizospheres along living roots in the upper 12 inches of the soil. In the Arid West, hydrologic indicators may be absent in any given year due to annual variability in precipitation and in times of drought. The *Arid West Supplement* (USACE, 2008) cites a technical standard that can be used for disturbed or problematic sites that support wetland vegetation and soils but where wetland hydrology is not apparent. 'This standard calls for 14 or more consecutive days of flooding, ponding, or

a water table 12 inches or less below the soil surface during the growing season at a minimum frequency of 5 years in 10.

Hydrophytic Vegetation: Hydrophytic vegetation is defined as plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present. Emphasis is placed on the assemblage of plant species that exert a controlling influence on the character of the plant community, rather than on a single indicator species, i.e., there must be a prevalence of hydrophytic vegetation present in order to satisfy this wetland parameter.

***Wetland Indicator Status*:** Refers to the probability that a plant will occur in a wetland or not. Indicator status categories are as follows:

- *Obligate (OBL)*: almost always occurs in wetlands
- *Facultative wetland (FACW)*: usually occurs in wetlands, sometimes may occur in uplands
- *Facultative (FAC)*: equally likely to occur in wetlands or uplands
- *Facultative upland (FACU)*: usually occurs in uplands but may occasionally occur in wetlands
- *Obligate upland (UPL)*: almost never occurs in wetlands
- *No indicator (NI)*: no indicator assigned due to lack of information

Hydric Soil: A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part is considered a hydric soil. Hydric soils are often characterized by redoximorphic features (such as redox concentrations, formerly known as mottles), which form by the reduction, translocation, and/or oxidation of iron and manganese oxides. Hydric soils may lack hydric indicators for a number of reasons. In such cases the same standard used to determine wetland hydrology when indicators are lacking can be used.

Ordinary High Water Mark: Ordinary high water mark (OHWM) is defined in 33 CFR § 328.3[e] as '…that line on the shore established by the fluctuations of water and indicated by physical characteristics, such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter or debris, or other appropriate means that consider the characteristics of the surrounding area'.

Other Waters: The term "other waters of the United States" includes water bodies, such as rivers and streams, that may not meet the full criteria for wetlands designation but that do exhibit evidence of an OHWM and are navigable or hydrologically connected to a navigable water body. Under the latest regulatory guidance, some types of other waters must have a significant nexus to a navigable water body to be considered jurisdictional by the USACE.

Traditionally Navigable Waters: Traditionally navigable waters (TNW) are all waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.

Relatively Permanent Waters: Relatively permanent waters (RPW) are non-navigable tributaries of traditional navigable waters that are relatively permanent, meaning they typically flow year-round or have continuous flow at least seasonally (e.g., typically three months).

Non-Relatively Permanent Waters: Non-relatively permanent waters (NRPW) include non-navigable tributaries with ephemeral or seasonal flows lasting less than three months.

Significant Nexus: This term refers to the hydrologic and ecologic connection between a TNW and its tributaries. Under recent guidance from the USACE and EPA certain wetlands and waters must have a significant nexus with a TNW in order to be considered jurisdictional.

Growing Season: The growing season is that part of the year when soil temperatures at 19.7 inches below the soil surface are higher than biologic zero (5°C/41° F). Growing season dates should be determined through onsite observations whenever possible. Since onsite data gathering is often not possible growing season dates can be approximated by using WETS tables from the nearest appropriate WETS station. The WETS table 70% probability average beginning and ending dates for 28° F temperatures can be used to represent the "normal" growing season for wetland determinations. According to the San Jose WETS Station data (see Appendix E) the normal growing season for the study area would be 365 days (USDA NRCS, 2015).

3.2 Regulatory Setting

Wetlands and other waters (e.g., rivers, streams, and natural ponds) are subsets of waters of the U.S. and receive protection under Section 404 of the Clean Water Act (CWA). The USACE has primary federal responsibility for administering regulations that concern waters of the U.S. and requires a permit if a project proposes discharges of dredged or fill material into waters of the U.S., including wetlands. The EPA has the ultimate authority under the CWA and can veto the USACE's issuance of a permit to fill jurisdictional waters of the U.S.

In recent years several Supreme Court cases have challenged the scope and extent of the USACE's jurisdiction over waters of the United States and have led to several reinterpretations of that authority. The most recent of these decisions are the case of *Solid Waste Agency of Northern Cook County v. the Army Corps of Engineers (SWANCC)* (January 9, 2001) and the consolidated *Rapanos v. United States* and *Carabell v. United States Army Corps of Engineers* cases (hereafter collectively referred to as the Rapanos case) (June, 2006). The SWANCC decision found that jurisdiction over non-navigable, isolated, intrastate waters could not be based solely on the use of such waters by migratory birds. The reasoning behind the SWANCC decision could be extended to suggest that waters need a demonstrable connection with a 'navigable water' to be protected under the CWA. The introduction of the term isolated has led to the consideration of the relative connectivity between waters and wetlands as a jurisdictionally relevant factor. The more recent Rapanos case further questioned the definition of "waters of the United States" and the scope of federal regulatory jurisdiction over such waters. This case resulted in a split decision which did not provide definitive answers but expanded on the concept that a 'significant nexus' with

traditional navigable waters was needed for certain waters to be considered within the jurisdiction of the USACE.

On June 5, 2007 the EPA and the USACE released guidance on CWA jurisdiction in response to the Rapanos decisions, which can be used to support a finding of CWA coverage for a particular water body when either a) there is a significant nexus between the stream or wetland in question and navigable waters in the traditional sense; or b) a relatively permanent water body is hydrologically connected to traditional navigable waters and/or a wetland has a surface connection with that water. According to this guidance the USACE and the EPA will take jurisdiction over the following waters: 1) Traditional navigable waters; 2) Wetlands adjacent to traditional navigable waters, including adjacent wetlands that do not have a continuous surface connection to traditional navigable waters; 3) Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months); 4) Wetlands adjacent to non-navigable tributaries, as defined above, that have a continuous surface connection to such tributaries (e.g. they are not separated by uplands, a berm, dike, or similar feature).

The EPA and the USACE will claim jurisdiction over the following waters, based on a fact-specific determination of significant nexus, as defined below, to a traditional navigable water: non-navigable tributaries that are not relatively permanent; wetlands adjacent to non-navigable tributaries that are not relatively permanent; and wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary.

The EPA and the USACE generally do not assert jurisdiction over the following features: swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow); ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

The EPA and the USACE have defined the significant nexus standard as follows:

> A significant nexus analysis assesses the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters.

Significant nexus analysis includes consideration of hydrologic and ecologic factors including: volume, duration, and frequency of flow; proximity to a traditional navigable water; size of the watershed; average annual rainfall; average annual winter snow pack; potential of tributaries to carry pollutants and flood waters to traditional navigable waters; provision of aquatic habitat that supports a traditional navigable water; potential of wetlands to trap and filter pollutants or store flood waters; and maintenance of water quality in traditional navigable waters.

3.3 Office Preparation

Literature Review

ESA reviewed the following information relevant to the delineation within the study area:

- Google Earth aerial photographs of the study area for the period 1993-2015 (Google Earth, 2016)
- USDA NRCS, Web Soil Survey online application (USDA NRCS, 2016)
- National Wetland Plant List (Lichvar, et al, 2016)
- National Wetlands Inventory (USFWS, 2015).

3.4 Field Survey Methods

Dates

ESA biologists S. Bishop and D. Rodriguez conducted a routine delineation of waters of the U.S. within the wetland delineation study area on December 1, 2015 and May 24, 2016. No precipitation events occurred for a week prior to the survey at the study area.

Field Delineation Methods

Data Collection

All wetland and drainage signatures on study area aerial photographs were investigated within the delineation study area. The delineation study area was walked such that visual coverage was 100%. All waters of the U.S. within the study area were delineated by comparing the aerial image to the existing site condition and GPS data collection. The delineation used the "Routine Determination Method" as described in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987), hereafter called the "1987 Manual." The 1987 Manual was used in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE, 2008), hereafter called the "Arid West Supplement." For areas where the 1987 Manual and the Arid West Supplement differ, the Arid West Supplement was followed.

Data was collected at eight sample points from the study area. In accordance with the USACE guidance, sample points were taken at sites representative of the vegetation, hydrology, and physical characteristics across the wetland types. Four paired wetland/upland data points were established with the wetland points occurring within freshwater marsh or willow scrub along lake shore or instream wetlands within the OHWM. Arid West data sheets were used to record information at each data point.

Determination of Hydrophytic Vegetation

At each sample point herbaceous vegetation was analyzed within an approximately three-foot radius. All species noted within the study plots were recorded on the data sheets. The indicator status of each species was confirmed in the field, to the extent feasible, with the *National Wetland Plant List – 2016 Wetland Ratings* (Lichvar, et al, 2016) for the Arid West Region. Dominant species were assessed using the recommended "50/20" rule per the 1987 Manual. Dominance and/or prevalence calculations were generally performed in the field as well. When the vegetation passed either the dominance or prevalence test the point was considered to have hydrophytic vegetation.

Determination of Hydric Soils

Soils were analyzed in accordance with the USACE's *Arid West Manual* (2008). Soil pits were excavated to the depth needed to document the presence or absence of hydric indicators and soil color was matched against a standard color chart (Kollmorgen Instruments Corporation, 1990). Soils were also inspected for redoximorphic features and soil texture was determined. It was then possible to determine if the soils met any of the hydric soils criteria listed on the Arid West data sheets while using the field indicators of hydric soils guide (USDA NRCS, 2010). Where soils did not exhibit hydric soil criteria consideration was given as to whether the sample point in question had the potential to be saturated, ponded or have a water table within 12 inches of the surface for 14 or more consecutive days during the growing season. With the presence of wetland vegetation and hydrology, this technical standard can be used to characterize a soil as hydric (USACE, 2008).

Determination of Wetland Hydrology

Presence of wetland hydrology was determined at each data point by presence of one or more of the following primary and/or secondary indicators, per guidance of the Arid West Supplement; visual observation of inundation, observation of soil saturation within 12 inches of the surface, oxidized root channels, algal matting, sediment deposits, flow or drift accumulations at channel margins, channel flow marks in beds, scouring, surface cracking, water staining, and topography ("wetland drainage patterns"). Evidence of wetland hydrologic characteristics, including OHWM in the creeks and river and around the lake utilized primary visual observation, focusing on drainage patterns, drift lines, sediment deposits, and watermarks.

Mapping and Acreage Calculations

All features, including wetland sample points, approximate wetland boundaries, OHWM intervals, and stream channels were recorded using a Trimble Global Positioning System (GPS) unit.

In the office, GPS data were downloaded and aquatic features mapped using Geographic Information System (GIS) software (ArcGIS 10.1) on an overlay of geo-referenced aerial photography. GPS-determined wetland sample points and OHWM were visually confirmed. Total area of potential wetlands and other waters and linear length of the channel were obtained by ArcGIS.

CHAPTER 4
Results

4.1 Results

A total of 37.12 acres (1,617,022 square feet) of potentially jurisdictional waters of the U.S. occur within the delineation study area which includes Alamitos Creek, Almaden Lake, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond. The total area includes: 0.46 acre (20,189 square feet) of freshwater marsh (lake shore), 0.23 acre (9,957 square feet) of willow scrub/freshwater marsh (instream wetlands), 2.11 acres (91,774 square feet) freshwater marsh (instream wetlands), and 34.32 acres (1,495,101 square feet) of other waters. A total of 2,062 linear feet of potentially jurisdictional waters of the U.S. occur within the creek and river segments in the delineation study area. **Table 4-1** below presents the delineated features within the delineation study area and summarizes estimated USACE jurisdictional areas for each feature type.

Wetland types within each study area are described in detail in section 4.1.2. Delineation maps and datasheets for the delineation, and other supporting information, such as a Jurisdictional Determination Analysis map, soils map, wetland datasheets, and representative photographs for the delineation study area are presented in Appendices A through F.

TABLE 4-1
POTENTIALLY JURISDICTIONAL WETLANDS AND OTHER WATERS OF THE U.S.

Feature type	Linear ft.	Area (ac)	Area (sq ft)
Alamitos Creek			
Wetlands			
Willow Scrub/Freshwater Marsh (Semipermanently flooded emergent)			
WS-1	NA	0.14	6,052
WS-2	NA	0.01	282
WS-3	NA	0.08	3,623
FWM-5	NA	0.04	1,913
Total Wetlands		***0.27***	***11,870***
Other Waters			
Riverine (Alamitos Creek)			
RIV-1 (Alamitos Creek)	490	0.41	17,679
RIV-2 (Alamitos Creek)	420	0.97	42,269
Total Other Waters	***910***	***1.38***	***59,948***
Almaden Lake			
Wetlands			
Freshwater Marsh (Semipermanently flooded emergent)			
FWM-1	NA	0.13	5,847
FWM-2	NA	0.01	486
FWM-3	NA	0.01	240
FWM-4	NA	0.31	13,616
Total Wetlands		***0.46***	***20,189***
Other Waters			
Lacustrine (Almaden Lake)			
LAC-1 (Almaden Lake)	NA	32.03	1,395,017
Total Other Waters		***32.03***	***1,395,017***
Guadalupe Creek			
Wetlands			
Freshwater Marsh (Semipermanently flooded emergent)			
FWM-6	NA	0.11	4,684
FWM-7	NA	0.20	8,652
Total Wetlands		***0.31***	***13,236***
Other Waters			
Riverine (Guadalupe Creek)			
RIV-3 (Guadalupe Creek)	67	0.09	3,910
RIV-4 (Guadalupe Creek)	180	0.17	7,708
Total Other Waters	***247***	***0.26***	***11,618***
Guadalupe River			
Wetlands			
Freshwater Marsh (Semipermanently flooded emergent)			
FWM-8	NA	1.71	74,472
FWM-9	NA	0.05	2,054
Total Wetlands		***1.76***	***76,526***
Other Waters			
Riverine (Guadalupe River)			
RIV-5 (Guadalupe River)	905	0.40	17,635
Total Other Waters	***905***	***0.40***	***17,635***
Los Alamitos Percolation Pond			
Other Waters			
Pond (Los Alamitos Percolation Pond)			
POND-1 (Los Alamitos Percolation Pond)	NA	0.25	10,884
Total Other Waters		***0.25***	***10,984***
Total Wetlands and Other Waters of the U.S.	***NA***	***37.12***	***1,617,022***

Potentially Jurisdictional Wetlands and Other Waters of the U.S.

Freshwater Marsh (Semipermanently Flooded Emergent Wetland)

Within the study area, freshwater marsh occurs around Almaden Lake, Alamitos Creek, Guadalupe Creek, and Guadalupe River. This community frequently occurs at the edge of the low water line up to the edge of the OHWM around the lake and creeks. Photo A in Appendix F presents the condition of freshwater marsh within the study area during the delineation in December 2015. Photo B in Appendix F presents the condition of freshwater marsh within the study area during the delineation in May 2016. Three soil samples were taken in freshwater marsh sample points at the edge of Almaden Lake, Guadalupe Creek, and Guadalupe River. Paired upland soil samples were also taken on the bank and are described in Section 4.1.2, Non-Jurisdictional Upland, below.

Vegetation

Plant biomass within the freshwater marshes was mostly from both the previous growing season and the current growing season and plant identification and cover estimates were based on both types of plant material. Freshwater marsh around the lake was dominated by wetland species that included cattail (*Typha angustifolia,* OBL), hardstem bulrush (OBL), mule fat (FAC), tall flatsedge (*Cyperus eragrostis*, FACW), hyssop loosestrife (*Lythrum hyssopifolia*, OBL), dotted smartweed (*Persicaria punctata*, OBL), and stinging nettle (*Urtica dioica*, FAC). Freshwater marsh around Alamitos Creek, Guadalupe Creek, and Guadalupe River were dominated by cattail (*Typha* sp. OBL), Himalayan blackberry (FAC), hardstem bulrush (OBL), mule fat (FAC), and fringed willow herb (FACW).

Hydrology

Water was present in the study area at the time of the delineation. In December 2015, due to drought conditions, in some locations the freshwater marsh was well above the current water line. However, in May, 2016 all freshwater marsh areas were inundated and the water levels appeared to be at the highest annual level, though within the normal operational range. Wetland hydrology indicators at the sample points included surface water (A1), high water table (A2), and inundation visible on aerial imagery (B7).

Soils

A high water table or surface water made taking soil samples difficult to assess because texture and saturation made it difficult to get a full profile sample. The soil sample at Almaden Lake was gravelly sand and was a problematic soil for identifying indicators, however the water table was so high and the area was within the OHWM, so the soils were assumed hydric. The soil samples at Guadalupe Creek and Guadalupe River both contained a high percentage of belowground biomass and both qualified as hydric soils as a histosol (A1) or 1 cm muck (A9).

Willow Scrub/Freshwater Marsh (Semipermanently Flooded Emergent Wetland)

Within the study area, willow scrub/freshwater marsh occur on sediment bars on both sides of the channel of Alamitos Creek upstream of Almaden Lake within the OHWM in areas that are saturated for at least 14 consecutive days during the growing season. Photo C in Appendix F shows conditions of willow scrub/freshwater marsh along Alamitos Creek within the study area during the delineation. Over time, these areas have been subject to deposition of sediment (sand) from flood deposition of upstream sediment. One soil sample was taken at willow scrub/freshwater marsh wetlands within the OHWM of the perennial creek. One paired upland soil sample was also taken outside of the OHWM and is described in Section 4.1.2, Non-Jurisdictional Upland, below.

Vegetation

The freshwater marsh/willow scrub vegetation consists mostly of herbaceous plants from the previous growing season. Plant identification and cover estimates were based on this plant material. Willow scrub areas were dominated by willow (*Salix* spp.; FACW), while freshwater wetland areas were dominated by fringed willowherb (FACW), and mugwort (*Artemisia douglasiana*, FAC), and in more open areas included narrow leaf cattail (*Typha angustifolia*, OBL) and hardstem bulrush (OBL).

Hydrology

Water was present in the study area at the time of the delineation and willow scrub/freshwater marsh was found adjacent to Alamitos Creek. Wetland hydrology indicators at this site included riverine drift deposits (B3) and drainage patterns (B10).

Soils

A soil sample was taken at the wetland sample point and the soil was sandy loam in texture. Sandy Redox (S5) was the hydric soil indicator at the sample point.

Other Waters of the U.S.

Alamitos Creek, Guadalupe Creek, and Guadalupe River are all perennial streams (riverine) within the delineation study area, Almaden Lake is a lake (lacustrine) within the delineation study area, and Los Alamitos Percolation Pond is a pond within the delineation study area. Areas within the OHWM consist of creek channels, a lake, a pond, and unvegetated areas below OHWM.

During the December 1, 2015 and May 23, 2016 delineation surveys, water was present within the Alamitos Creek, Almaden Lake, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond.

Within the study area, upstream of Almaden Lake the OHWM of Alamitos Creek ranged from 45 feet to 70 feet in width, with an average of 56 feet. Downstream of Almaden Lake, only the west side of Alamitos Creek is included in the study area, so an OHWM width was not determined.

The Alamitos Creek reaches within this study area, both upstream and downstream of Almaden Lake, total 910 linear feet and 1.38 acres of other waters.

Guadalupe Creek within the study area covers 247 linear feet and 0.26 acre of other waters. Guadalupe River within the study area covers 905 linear feet and 0.40 acre of other waters. The OHWM within the upstream segment of Guadalupe Creek ranged from 37 feet to 66 feet in width with an average of 58 feet. The downstream segment of Guadalupe Creek and the segment of Guadalupe River do not span the entire width of the OHWM and therefore OHWM widths were not determined.

The OHWM for Almaden Lake and Los Alamitos Percolation Pond were both mapped based on visual observations of shelving, scouring, drainage patterns, drift lines, sediment deposits, and watermarks. The area of other waters associated with Almaden Lake is 32.03 acres. The area of other waters associated with Los Alamitos Percolation Pond is 0.25 acre.

Non-Jurisdictional Upland

Almaden Lake Park contains much of the project area that is above OHWM. Almaden Lake Park above OHWM generally contains bare ground or mowed grasses and herbs with some overstory trees and shrubs. Common upland vegetation around Almaden Lake includes fan palm (*Washingtonia* sp.), pepper tree, gum trees (*Eucalyptus* sp.), coyote brush, and stinkwort (*Dittrichia graveolens*).

Portions of Alamitos Creek banks are also above OHWM. The banks of Alamitos Creek upstream of Almaden Lake is generally populated by non-native herbaceous and grass understory and native riparian tree canopy. Vegetation within the uplands around Alamitos Creek included California sycamore (FAC), blue elderberry (*Sambucus nigra*, FAC), Himalayan blackberry (FAC), and smilo grass (FACU). The upland areas along Alamitos Creek downstream of Almaden Lake are dominated by non-native annual grassland.

Guadalupe Creek uplands are dominated by Himalayan blackberry and wall bedstraw (*Galium parisiense*, UPL) and a sparse tree canopy of riparian tree species. Guadalupe River uplands occur on a steep bank up to a walking trail and are dominated by wild oat (UPL), but also contain some willow trees (*Salix exigua* and *Salix laevigata*, FACW) at the wetland and upland border.

Uplands along the Los Alamitos Percolation Pond were dominated by an overstory of planted Freemont cottonwood trees (*Populus fremontii*, FAC) and an annual grassland understory dominated by wild oat, ripgut brome (*Bromus diandrus*, UPL), smilo grass, and black mustard (*Brassica nigra*, UPL).

Sample point 1B, 2B, 3B, and 4B all represent upland terraces or banks adjacent to Almaden Lake, Alamitos Creek, Guadalupe Creek, and Guadalupe River (see Appendix B for datasheets). The photo for sample point 1B, 2B, and 4B in Appendix F presents conditions at the upland terrace within the study area during the delineation. The terraces at the sample points are located above OHWM and are unlikely to get flooded, even during heavy storms due to the storage

capacity of Almaden Lake. No wetland hydrology or soil indicators were present at any upland sample points.

4.2 Clean Water Act Analysis

A Jurisdictional Determination Analysis map, which summarizes the information presented here, can be found in Appendix C. This section provides a brief summary of the Clean Water Act Analysis (CWA Analysis). Information used to support the CWA Analysis presented herein includes the following: review of U.S. Geological Survey (USGS) topographic quadrangles and high resolution aerials covering the study area; and field studies conducted in December 2015 and May 2016. Proposed classification of waters as traditionally navigable waters (TNWs) and relatively permanent waters (RPWs) are based on results of the literature review and field surveys in connection with the delineation. There are a number of potential biological, chemical, and physical processes being performed by Alamitos Creek, Almaden Lake, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond. These include transport of water and nutrients to downstream waters, processing of organic wastes, attenuation of downstream flooding through interception of surface runoff and water storage onsite, reduction of suspended sediment delivered to downstream waters, groundwater replenishment, and supporting biodiversity at the site and watershed levels through provision of wetland habitat. No specific studies regarding duration of flow, groundwater measurement, or ecological function and values of streams and wetlands covered in this delineation were conducted. The magnitude at which these functions are being performed is also, for the most part, unknown.

The project area contains Alamitos Creek, Almaden Lake, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond. Based on the site surveys in December 2015 and May 2016 and review of aerial photos from 1993-2015 (Google Earth, 2016), the project site conveys water year round.

Alamitos Creek, a RPW, flows into Almaden Lake, a TNW, before flowing into another short segment of Alamitos Creek. Alamitos Creek then becomes the mainstem of the Guadalupe River, another RPW, at the confluence of Guadalupe Creek, a RPW, and Alamitos Creek. Guadalupe River is connected to Los Alamitos Percolation Pond through a managed culvert. The Guadalupe River then flows into Alviso Slough, a TNW. Alviso Slough then connects to the mouth of Coyote Creek, also a TNW, before ultimately flowing into the San Francisco Bay, a TNW (see Appendix C). The project site is considered a RPW with permanent flow and has a significant nexus with a TNW. Wetland and waters within the project area are therefore likely to be considered jurisdictional by the USACE.

The wetlands within the delineation study area lie within the OHWM of Alamitos Creek, Almaden Lake, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond and are therefore considered adjacent wetland. The USACE takes jurisdiction over wetlands that are adjacent to a RPW or TNW if those wetlands have a continuous surface connection to the RPW or TNW. The wetlands within the study area are within the OHWM and have a continuous

surface connection to a RPW or TNW. The USACE is therefore also likely to take jurisdiction over the adjacent wetlands.

CHAPTER 5
Report Preparation and References

5.1 Report Preparation

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Senior Review:	C. Rogers
Wetland Delineation:	S. Bishop, D. Rodriguez
Report Preparation:	S. Bishop
GIS:	S. Bishop
Graphics:	S. Bishop

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APPENDIX A
Delineation Maps



SOURCE: imagery (ESRI), wetlands & waters (ESA, 2016)

Almaden Lake Project . 130679

Figure A-1

Potentially Jurisdictional Wetlands and Other Waters of the U.S.

APPENDIX B
Wetland Datasheets

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 12/1/2015

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 1A

Investigator(s): D. Rodriguez, S. Bishop Section, Township, Range: S16 T8S R1E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): C - Mediterranean California Lat: 37°14'18.76"N Long: 121°52'16.48"W Datum: NAD 83

Soil Map Unit Name: Cumulic Haploxerolls, 1 to 5 percent slope NWI classification: Lake

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

Sample point is near where Los Alamitos Creek flows into Lake Almaden. Water levels are lower than normal due to drought conditions. The hydrologic regime is managed. A flashboard dam downstream of the Lake is installed in the spring and removed prior to winter storms.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 3 ft x 3 ft)			
1. Rubus armeniacus	1	Yes	FAC
2.			
3.			
4.			
5.			
	1 = Total Cover		
Herb Stratum (Plot size: 3 ft x 3 ft)			
1. Schoenoplectus acutus	95	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust 4

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 95	x 1 = 95
FACW species _____	x 2 = _____
FAC species 1	x 3 = 3
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 96 (A)	98 (B)

Prevalence Index = B/A = 1.02

Hydrophytic Vegetation Indicators:

_____ Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

Highly vegetated area with a lot of aboveground biomass - just within OHWM.

SOIL

Sampling Point: 1A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 3/2	100					sandy loam	
2-15	10 YR 3/2	85	7.5 YR 5/8	15	RM	M	sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

A lot of biomass present above and below ground from schoenoplectus acutus.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- X Drift Deposits (B3) (**Riverine**)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 12/1/2015

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 1B

Investigator(s): D. Rodriguez, S. Bishop Section, Township, Range: S16 T8S R1E

Landform (hillslope, terrace, etc.): upland terrace Local relief (concave, convex, none): none Slope (%): 5

Subregion (LRR): C - Mediterranean California Lat: 37°14'18.71"N Long: 121°52'15.97"W Datum: NAD 83

Soil Map Unit Name: Cumulic Haploxerolls, 1 to 5 percent slope NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

Rip rap placed between wetland and upland. Upland in park with benches. Trees and shrubs in upland area may have been planted.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 3 ft x 3 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Platanus occidentalis	20	Yes	FAC
2.			
3.			
4.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: 3 ft x 3 ft)			
1. Baccharis pilularis	15	Yes	UPL
2.			
3.			
4.			
5.			
	15 = Total Cover		
Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species 20	x 3 = 60
FACU species _____	x 4 = _____
UPL species 15	x 5 = 75
Column Totals: 35 (A)	135 (B)

Prevalence Index = B/A = 3.86

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

US Army Corps of Engineers

SOIL

Sampling Point: 1B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-15	10 YR 3/4	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- Drift Deposits (B3) (**Riverine**)
- Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 12/1/2015

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 2A

Investigator(s): D. Rodriguez, S. Bishop Section, Township, Range: S16 T8S R1E

Landform (hillslope, terrace, etc.): slope at edge of lake Local relief (concave, convex, none): none Slope (%): 5

Subregion (LRR): C - Mediterranean California Lat: 37°14'33.66"N Long: 121°52'10.21"W Datum: NAD 83

Soil Map Unit Name: Water NWI classification: Lake

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil X, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

At edge of the Lake. Soils problematic, potentially significantly disturbed. Sandy gravelly soil. Hydrology significantly disturbed by flashboard dam that is installed seasonally downstream of the project area.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	1 = Total Cover		
Herb Stratum (Plot size: 1.5 ft x 6 ft)			
1. Persicaria punctata	15	Yes	OBL
2. Baccharis salicifolia	15	Yes	FAC
3. Typha angustifolia	5	No	OBL
4. Lythrum hyssopifolia	5	No	OBL
5. Cyperus eragrostis	3	No	FACW
6. Melilotus alba	3	No	UPL
7. Panicum sp. (capillare or hillmanii)	3	No	FACU
8. Rumex sp.	1	No	?
	50 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

About 1.5 feet from waters edge, plant area measured in a long skinny polygon to capture the narrow wetland strip between the lake and uplands. Dittrichia in area just upland of wetlands, area still within OHWM, but not a wetland plant.

SOIL

Sampling Point: 2A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5 YR 3/3	100					gravelly sand	
3-12	GLEY 1 2.5/5 GY	100					gravelly sand	water present in this layer, soils falling apart

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

Gravelly sandy soils that falls apart. Problematic soil. Assumed hydric because within OHWM, with high water table (during drought) and contains hydrophytic vegetation. Gravel potentially placed here to try and prevent bank erosion.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- Drift Deposits (B3) (**Riverine**)
- Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes X No ___ Depth (inches): 4 in

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Strong algae smell.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 12/1/2015

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 2B

Investigator(s): D. Rodriguez, S. Bishop Section, Township, Range: S16 T8S R1E

Landform (hillslope, terrace, etc.): terrace, sloped towards the lake Local relief (concave, convex, none): convex Slope (%): 10

Subregion (LRR): C - Mediterranean California Lat: 37°14'33.60"N Long: 121°52'10.02"W Datum: NAD 83

Soil Map Unit Name: Urbanland-Clear Lake complex, 0 to 2 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

Area just above eroded bank, OHWM is at the eroded bank edge. Drought conditions.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	1 = Total Cover		
Herb Stratum (Plot size: 3 ft x 3 ft)			
1. Hordeum murinum	20	Yes	FACU
2. Dittrichia graveolens	15	Yes	FACU
3. Epilobium branchiumtharum	1	No	UPL
4.			
5.			
6.			
7.			
8.			
	36 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 64 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

Little seedlings of Dittrichia graveolens and Hordeum murinum just coming in. Both identified from dead plants from last year.

US Army Corps of Engineers

SOIL

Sampling Point: 2B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-15	10 YR 4/4	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- Drift Deposits (B3) (**Riverine**)
- Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 5/24/2016

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 3A

Investigator(s): S. Bishop Section, Township, Range: S9 T8S R1E

Landform (hillslope, terrace, etc.): creek floodplain Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): C - Mediterranean California Lat: 37°14'38.53"N Long: 121°52'25.15"W Datum: NAD 83

Soil Map Unit Name: Urbanland-Landelspark complex, 0 to 2 percent slopes NWI classification: riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

hydrology managed by flashboard dam downstream - water levels currently at high level, flashboard installed in the spring

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 3 ft x 3 ft)			
1. Typha spp.	100	YES	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 3 ft x 3 ft)			
1. Rubus armeniacus	50	YES	FAC
2.			
	50 = Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

Typha cover was from dead material only. Rubus cover was from alive plant material. Plants seen nearby but not within the plot: Baccharis salicifolia, Atriplex prostrata, Schoenoplectus acutus, Rumex crispis, and Epilobium ciliatum However throughout this section of Guadalupe Creek Himalayan blackberry is the dominant plant.

SOIL

Sampling Point: 3A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 3/1						clay loam	decomposed plant material, greasy feel
2-12	10 YR 3/2						clay loam	soil falling apart - very wet

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- X 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 5 inches

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Water levels are high from flashboard dams being in place downstream.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 5/24/2016

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 3B

Investigator(s): S. Bishop Section, Township, Range: S9 T8S R1E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 5

Subregion (LRR): C - Mediterranean California Lat: 37°14'38.73"N Long: 121°52'25.18"W Datum: NAD 83

Soil Map Unit Name: Urbanland-Landelspark complex, 0 to 2 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil X, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

Rip rap placed here, so couldn't take a soil sample. The flashboard dam downstream was installed during the time of the survey and water levels appeared to be approximately at there highest annual level.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: 3 ft x 3 ft)			
1. Rubus armeniacus	100	YES	FAC
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 3B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ **No** X

Remarks:

Rip rap at this location so couldn't take a soil sample.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

On slope up to levee. Above the OHWM.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 5/24/2016

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 4A

Investigator(s): S. Bishop Section, Township, Range: S9 T8S R1E

Landform (hillslope, terrace, etc.): edge of floodplain, toe of slope Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): C - Mediterranean California Lat: 37°14'43.41"N Long: 121°52'19.92"W Datum: NAD 83

Soil Map Unit Name: Urbanland-Landelspark complex, 0 to 2 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

hydrology managed, flashboard dam currently installed, water levels high

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 6 ft x 1.5 ft)			
1. Typha sp.	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

Typha mostly dead material from the previous growing season, some new Typha just starting to come in, but doesn't yet contain any features to identify to species.

SOIL

Sampling Point: 4A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10 YR 3/2	100					sandy loam	mostly underground biomass
8-12	10 YR 3.2	10					rock/sandy loam	the rest of the matrix was made up of rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- X Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

top 8 inches of soil mostly underground biomass, roots and rhizomes

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No _____ Depth (inches): 4 inches

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

A lot of dead aboveground biomass, once removed then noticed the standing water, steep slope of levee just above the sample point.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 5/24/2016

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 4B

Investigator(s): S. Bishop Section, Township, Range: S9 T8S R1E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 10

Subregion (LRR): C - Mediterranean California Lat: 37°14'43.48"N Long: 121°52'20.01"W Datum: NAD 83

Soil Map Unit Name: Urbanland-Landelspark complex, 0 to 2 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks:

on levee slope, near the toe of the levee slope

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 1.5 ft x 6 ft)			
1. Avena fatua	50	Y	UPL
2. Cynodon dactylon	5	N	FACU
3. Brassica nigra	2	N	UPL
4. Lactuca serriola	1	N	FACU
5. Stipa miliaceae	1	N	FACU
6.			
7.			
8.			
	59 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 11 % Cover of Biotic Crust 30 (thatch)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

SOIL

Sampling Point: 4B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 3/2	100					sandy loam	lost of small rocks in the soil

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Rock

Depth (inches): 12 inches

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

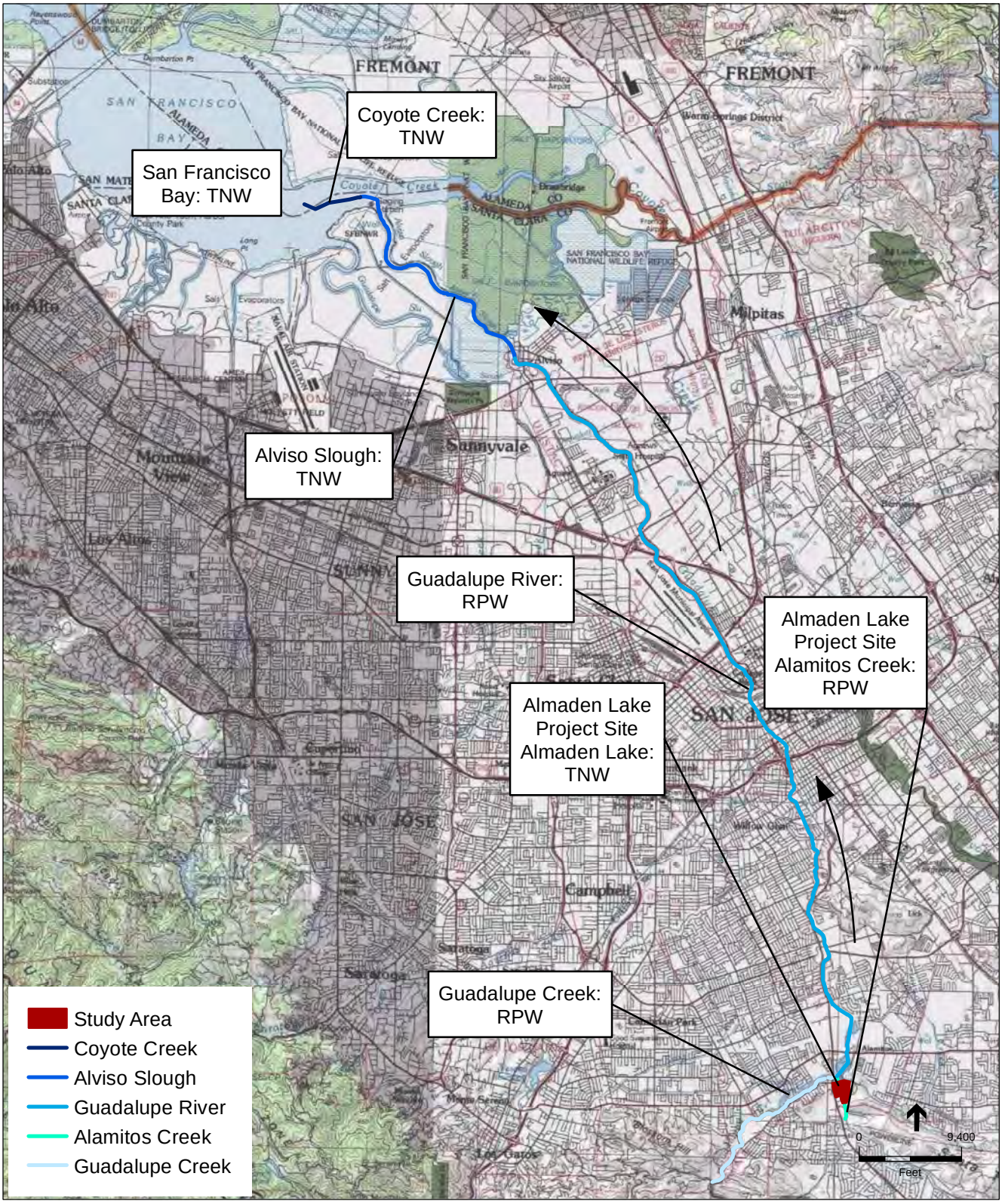
Wetland Hydrology Present? **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX C

Jurisdictional Determination Analysis Map



SOURCE: imagery (ESRI)

Almaden Lake Project . 130679

Figure C-1

Jurisdictional Determination Analysis Map

APPENDIX D
Soils Map

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Clara Area, California, Western Part
Survey Area Data: Version 4, Sep 3, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 6, 2015—Jun 7, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Santa Clara Area, California, Western Part (CA641)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
130	Urban land-Still complex, 0 to 2 percent slopes	0.0	0.0%
131	Urban land-Elpaloalto complex, 0 to 2 percent slopes	3.4	5.1%
160	Urbanland-Clear Lake complex, 0 to 2 percent slopes	2.6	4.0%
165	Urbanland-Campbell complex, 0 to 2 percent slopes, protected	0.7	1.1%
170	Urbanland-Landelspark complex, 0 to 2 percent slopes	19.4	29.3%
190	Cumulic Haploxerolls, 1 to 5 percent slopes	3.8	5.8%
378	Urbanland-Alumrock-Zeppelin complex, 9 to 15 percent slopes	1.3	2.0%
W	Water	34.9	52.8%
Totals for Area of Interest		**66.1**	**100.0%**

APPENDIX E

WETS Tables for San Jose, Santa Clara County

USDA Field Office Climate Data

WETS Station : SAN JOSE, CA293 Creation Date: 01/14/2016
Latitude: 3722 Longitude: 12155 Elevation: 00051
State FIPS/County(FIPS): 06085 County Name: Santa Clara
Start yr. - 1971 End yr. - 2000

Month	Temperature (Degrees F.) avg daily max	avg daily min	avg	Precipitation (Inches) avg	30% chance will have less than	more than	avg # of days w/.1 or more	avg total snow fall
January	59.3	41.7	50.5	3.03	1.29	3.69	7	0.0
February	63.4	44.6	54.0	2.84	1.19	3.46	6	0.0
March	67.0	46.4	56.7	2.69	1.13	3.27	6	0.0
April	72.1	48.3	60.2	1.02	0.39	1.23	3	0.0
May	76.7	51.8	64.3	0.44	0.00	0.46	1	0.0
June	81.8	55.4	68.6	0.10	0.00	0.08	0	0.0
July	84.3	57.5	70.9	0.06	0.00	0.00	0	0.0
August	84.0	57.7	70.9	0.07	0.00	0.00	0	0.0
September	82.2	56.7	69.5	0.23	0.00	0.22	1	0.0
October	75.9	52.3	64.1	0.87	0.33	1.09	2	0.0
November	65.3	45.6	55.5	1.73	0.54	2.06	4	0.0
December	58.9	41.0	50.0	2.00	0.95	2.45	5	0.0
Annual	-----	-----	-----	------	11.56	17.49	--	----
Average	72.6	49.9	61.3	------	------	------	--	----
Average	-----	-----	-----	15.08	------	------	35	0.0

GROWING SEASON DATES

Probability	Temperature 24 F or higher	28 F or higher	32 F or higher
	Beginning and Ending Dates Growing Season Length		
50 percent *			1/11 to 12/29 351 days
70 percent *			> 365 days > 365 days

APPENDIX F
Representative Photographs



Almaden Lake Project . 130679

Photo A

Freshwater Marsh at the edge of Almaden Lake



Almaden Lake Project . 130679

Photo B

Freshwater marsh along Guadalupe River, Sample Point 4A



Almaden Lake Project . 130679

Photo C

Alamitos Creek looking downstream toward Almaden Lake showing willow scrub/freshwater marsh adjacent to the channel



Almaden Lake Project . 130679

Sample Point 1B

Uplands, containing coyote brush at sample point 1B



Almaden Lake Project . 130679

Sample Point 2B

Upland sample point showing maintained park area above OHWM



Almaden Lake Project . 130679

Sample Point 4B

Upland sample point showing non-native annual grassland above OHWM

Appendix D
Geotechnical Report



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30 April 2015

Karl Neuman, P.E., G.E.
Associate Civil Engineer
Dams & Pipelines Project Delivery Unit
Water Utility Enterprise
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Subject: FINAL - Geotechnical Investigation Report for Design of Almaden Lake Project, San Jose, California

Dear Mr. Neuman:

Cal Engineering & Geology, Inc. (CE&G) is pleased to submit this geotechnical investigation report for design of the Santa Clara Valley Water District's (District) planned improvements to Almaden Lake in San Jose, California. Our scope of work was developed from our understanding of the project based on our correspondence with you, information available on the District website, and our understanding that Alternatives 6 and 7 have been identified by the District as the preferred alternatives for the project.

The investigation, geotechnical evaluation, and this report were completed by Mr. Dan Peluso (GE 2367), Mr. Elijah Zane (GE 3035), and Mr. Dave Burger (CEG 2553), and reviewed by Mr. Phillip Gregory (GE 2193) of CE&G.

CE&G greatly appreciates the opportunity to submit this geotechnical investigation report for design of the planned improvements to Almaden Lake.

If there are any questions concerning the information provided herein, please do not hesitate to contact us.

Sincerely,

CAL ENGINEERING & GEOLOGY

Dan Peluso, P.E., G.E.
Associate Engineer

Elijah Zane, P.E., G.E.
Senior Engineer

Dave Burger, P.G., CEG
Project Geologist

TABLE OF CONTENTS

1. Introduction....3
1.1 Project Goals and Objectives....3
1.2 Scope of Work....3
2. Site and Project Descriptions....5
2.1 Site Description....5
2.2 Project Description....6
2.3 Preferred Alternatives 6 and 7....7
3. Geologic and Seismic Setting....9
3.1 Physical Setting....9
3.2 Site Geology....9
3.3 Surficial Soils....9
3.4 Seismicity....10
4. Site Investigation....13
4.1 Data Review....13
4.2 Field Reconnaissance....13
4.3 Current Subsurface Exploration....13
4.4 Geotechnical Laboratory Testing....19
4.5 Environmental Sampling and Testing....19
5. Levee Geotechnical Analysis....20
5.1 Scope of Analysis....20
5.2 Liquefaction Analysis....20
5.3 Levee Configurations....22
5.4 Seepage Analysis....24
5.5 Slope Stability Analysis....27
5.6 Settlement Analysis....32
5.7 Levee Embankment Erodability....34
6. Conclusions....36
6.1 General....36
6.2 Foundation Conditions....36
6.3 Levee Stability....36
6.4 Groundwater....37
6.5 Erosion....37
6.6 Seismic Hazards....37
7. Recommendations....38
7.1 Earthwork....38
7.2 Headwall Design Parameters....44
7.3 Additional Design Considerations....45

8. Limitations 47
9. References 49

FIGURES

Figure 1 Site Location Map
Figure 2 Alternative 6 Site Plan
Figure 3 Alternative 7 Site Plan
Figure 4 Alternative 6 Sections
Figure 5 Alternative 7 Sections
Figure 6 Regional Geology Map
Figure 7 Seismic Hazard Zone Map
Figure 8 NRCS Surficial Soil Map
Figure 9 Typical Levee Section

APPENDICES

Appendix A Boring Logs
Appendix B Laboratory Test Results
Appendix C Liquefaction Evaluation
Appendix D Seepage Evaluation
Appendix E Slope Stability Calculations
Appendix F Settlement Calculations
Appendix G Rock Slope Protection Analysis

1. Introduction

Cal Engineering & Geology, Inc. (CE&G) has provided geotechnical engineering services for the Santa Clara Valley Water District's (District) Almaden Lake Improvement Project located in San Jose, California. The work has been completed to develop geotechnical data and recommendations for the District to design improvements to separate Alamitos Creek from the existing lake. The planned improvements will include construction of a new earth levee bisecting the existing lake with a maintenance road across the levee. The levee will separate the lake from Alamitos Creek which will be conveyed in a new terraced channel.

The geotechnical investigation included completion of a subsurface exploration program designed to collect subsurface data at selected locations and laboratory testing of selected soil samples retrieved from the borings to provide information regarding the existing soil conditions to support the project design. Engineering analysis included evaluation of slope stability, seepage, settlement, and liquefaction susceptibility of the proposed improvements.

1.1 Project Goals and Objectives

The Almaden Lake Improvement Project (Project) is being undertaken to address a number of issues affecting the mercury related water quality in the lake as well as secondary environmental effects caused by the current configuration of the lake. As described in the District's project website, the objectives of the project include:

- Reduce methylmercury concentrations in the lake and production of methylmercury to meet water quality objectives set by the San Francisco Regional Water Quality Control Board;
- Reduce mercury in fish;
- Reduce thermal barrier to cold-water fish migration;
- Remove entrainment - incidental trapping of fish - and impacts from predatory species to cold-water fish and minimize impacts to recreational features.

1.2 Scope of Work

The scope of work completed for the design level geotechnical investigation and report included:

1. Management of the geotechnical investigation portion of the project; meetings with the District and other design team consultants (as needed) during design development; and geotechnical review of preliminary design documents.

2. Completion of an office study to identify and evaluate relevant geologic and geotechnical information available for the site, published geologic maps, and previously prepared reports regarding the site.
3. A subsurface exploration and laboratory testing program to develop information needed in geotechnical analyses and preparation of the geotechnical report and for the design and construction of the project.
4. Completion of engineering analyses to develop geotechnical parameters for design of the new levee and other appurtenant improvements.
5. Preparation of a draft and final geotechnical investigation report.

The scope of work did not include identification or evaluation of possible borrow sources for levee fill or general fill materials. However, this report identifies the required geotechnical properties of import materials for the levee fill and general fill.

The scope of work did not include evaluation of or characterization of soil or water contaminates at the site.

2. Site and Project Descriptions

2.1 Site Description

Almaden Lake Park is located in the City of San Jose at the southeast corner of Almaden Expressway and Coleman Road. The park was opened in 1982, encompasses approximately 65 acres, and is owned and operated by the City of San Jose (City) (Almaden Lake Park, City of San Jose Parks & Recreation Department website). The park is bounded on the north by Coleman Road, on the west by Almaden Expressway, on the east by Winfield Boulevard, and on the south by a pedestrian bridge over Alamitos Creek, Los Alamitos Creek Trail and commercial properties. Alamitos Creek flows through the south end of the park, into Almaden Lake, exits the lake at the north end, continues northward, and joins with Guadalupe Creek on the north side of Coleman Road. The location of Almaden Lake Park is shown on Figure 1, Site Location Map.

The on-land portion of the park property lies at elevations between approximately 190 and 210 feet above sea level (NAVD88). The high water elevation of the lake is approximately at elevation 190 feet.

The ground surface elevation within the lake is highly variable, with the lowest elevation of the lake at approximately 150 feet in the west lake area. There is a small island in the west-central portion of the lake.

2.1.1 Site History

Almaden Lake lies wholly within Almaden Lake Park and was opened for public use as a park in 1982. The 32-acre man-made body of water was once a privately owned gravel quarry and was created as a result of the quarry operation, which began in the late 1940s. Excavation for the quarry started adjacent to Alamitos Creek and moved outward, transforming a meadow where dairy cows once grazed into a lake. The lake has offered a range of activities over the years, including fishing, swimming, pedal boating and athletic events. (Almaden Lake Park, City of San Jose Parks & Recreation Department Website)

Over the years, elementary mercury from mines upstream has settled at the bottom of Almaden Lake and is converting to methylmercury, resulting in the designation of the lake as an impaired water body. To address the methylmercury problem, the San Francisco Regional Water Quality Control Board derived site-specific mercury water quality objectives for mercury in fish tissue and a total maximum daily load (TMDL) of mercury in water for Almaden Lake (District project website, http://www.valleywater.org/Mercury/AlmadenLake.aspx).

Another issue that has impaired the lake is waste from Canadian Geese and seagulls in and around the lake which has made the water unsafe for recreational swimming. In addition, the lake has been serving as a heat barrier to cold-water fish migrating upstream to spawn.

Cleanup efforts have included installation and operation of solar powered water-circulation machines, which have aided in decreasing the production of methylmercury in the lake, but not to the extent needed to meet the site-specific mercury water quality objectives (District project website, http://www.valleywater.org/Mercury/AlmadenLake.aspx).

2.1.2 Existing Improvements

Almaden Lake is centrally located within Almaden Lake Park. The City has made significant improvements to the park, which include a parking lot on the northwest side (accessed off of Almaden Expressway) with adjacent paved trails, playgrounds, bathroom facilities, picnic areas, a beach area (on the west lake shore) and other landscaping. Another parking lot (accessed off of Winfield Boulevard) is located on the southeast side of the park. Similar improvements located on the east side of the lake include trails, playgrounds, picnic areas, and landscaping, as well as additional bathroom facilities. A pedestrian bridge at the southern end of the park provides access across Alamitos Creek.

The paved trails around the lake link with the Los Alamitos Creek Trail that extends southward along the east side of Alamitos Creek. The trails extend northward along the lake, pass under the Coleman Avenue bridge over Alamito Creek, and join with the Guadalupe River Trail along the east side of Guadalupe Creek.

2.1.3 Lake Operations

The day-to-day operation of Lake Almaden Park is conducted by the City of San Jose Department of Parks, Recreation & Neighborhood Services.

2.2 Project Description

The District's Almaden Lake Improvement Project (Project) is intended to substantially reduce the amount of methylmercury produced in the lake and improve conditions for anadromous fish. The Project will include the following elements:

- Isolation of Alamitos Creek in a channel with a minimum width of approximately 210 feet, separated from the remaining lake to the east by a new embankment or levee.
- Re-contouring of the bottom of the lake to a more level surface and capping the existing mercury laden sediment with a 10-foot thick layer of clean low permeability clay fill.

- Expansion of the open park area to the west by filling in up to 1-acre of the westerly swimming hole.
- Piping to connect the lake to Alamitos Percolation Pond to develop a flow through system. Headwalls will be constructed where the pipes pass through the levee.
- Provide for a maintenance road and trail on the top of the new levee.
- Expansion of the existing island up to 0.75 acre and stabilization of the island shoreline.
- Establishment of a second island, up to 0.75 acre in area.
- Installation of riparian vegetation along the banks of the new channel and islands.

2.3 Preferred Alternatives 6 and 7

The general concepts of both Alternative 6 and Alternative 7 call for a restored creek section that is flanked by a lake to the east and park space to the west. The alternatives are nearly identical with the exception of the area on the west shore near the existing boating facility. District staff have indicated that Alternative 7 is currently the favored concept. The proposed improvements are shown on Figure 2, Alternative 6 Site Plan and Figure 3, Alternative 7 Site Plan.

Both alternatives require the existing boating facility to be relocated. Alternative 6 does not impact any other park facilities or land area. Alternative 7, however, calls for removing a portion of the existing lake shoreline where the boating facility is currently located. This will allow the restored creek section to be realigned more westerly and allow for more lake area to remain. Alternative 7 will also impact one picnic site and part of an existing pathway with both of these park facilities to be relocated in the same general area along the new western creek embankment. For both alternatives, the high water lake level will be maintained at its current level of 190 feet.

For both alternatives, approximately 1,600-feet of the creek will be restored. To divert creek water into the lake, a diversion structure will be constructed in the new levee near Coleman Road. The diversion structure will only allow water to flow one way into the lake and be screened so fish cannot pass between the creek and the lake. The upper 800-feet of the restored creek section will reflect a typical low-flowing creek channel similar to the existing creek area located at the upstream end of the park. We understand the lake is regularly maintained in a "full" condition primarily due its recreational use. However, we presume there may be a need to drain the lake periodically for maintenance purposes.

A new levee will separate the restored creek from the lake to the east. The levee will be a minimum of 40-feet wide at the top and on the top of the levee there will be a dual use maintenance road and pedestrian pathway. The pedestrian pathway will tie into the existing park pathways near Coleman Road and connect to the pathway at the south end of the park north of the existing pedestrian bridge. The side slopes of the levee are currently planned to have a 2H:1V gradient. Portions of the crest and sides of the new levee will be planted with small trees and low shrubbery appropriate to a riparian habitat, although a planting plan has not yet been developed. Limiting the types of vegetation on the levee will ensure that the integrity of the levee is not compromised by large tree roots and that the realigned creek channel can convey the design flows.

The two islands planned within the reconfigured Almaden Lake are shown to vary between approximately 120 feet and 240 feet in plan dimension and to have 1H:1V gradient side slopes.

The restored creek will vary in width between approximately 210-feet to over 400-feet wide from top of bank to top of bank and will be designed to convey a 100-year flood event. The 100-year water surface elevation will be a minimum of 2-feet below the top of the new levee. However, the entire perimeter of the existing Almaden Lake boundary will remain mapped in the existing FEMA flood maps. Flow velocities along the banks of the creek in the project area during the 100-year flood event have been determined by the District to be 8 feet per second (fps) (email of 11-26-2014 and telephone conversation of 12-4-2014 with James Ujah, District Project Manager).

Creation of the restored creek and levee will require the placement of between about 551,000 and 577,000 cubic yards of fill, depending on whether Alternative 6 or Alternative 7 is implemented. A source of levee fill import material has not been identified. However, District staff have indicated that Stevens Creek Quarry is a common source they use for levee fill material.

Representative cross sections depicting the proposed grade changes for Alternative 6 and 7 and shown on Figure 4, Alternative 6 Sections, and Figure 5, Alternative 7 Sections.

3. Geologic and Seismic Setting

3.1 Physical Setting

The Almaden Lake Improvement Project site lies within the Coast Ranges geomorphic province of California. This province is characterized by northwest-southeast trending mountain ranges and intervening valleys. The site is located on the northeastern margin of the Almaden Valley, a northwest-southeast trending valley immediately downstream and northwest of Calero Reservoir; topographic ridges bordering the valley also trend northwest-southeast. Alamitos Creek flows northwest through the site. The site is located at an elevation of about 195 feet above sea level. Land use in the vicinity is moderate-density residential.

3.2 Site Geology

The generalized geology of the San Jose area has been mapped by a number of geologists. Almaden Lake is located on the eastern margin of a relatively flat alluvial valley. Mclaughlin, et. al. (2001b) show the project site is primarily underlain by Quaternary age Holocene gravel pit deposit and bounded along the western margin by Holocene age alluvial fan deposits (Figure 6). The hillside to the east of the project site are mapped as Upper Cretaceous age franciscan mélange of the Central belt with Eocene age sandstone and mudstone mapped to the south and west of the project site. Knudsen, et. al. (2000) show the site to be underlain by latest Pleistocene to Holocene alluvial fan levee deposits and Holocene alluvium. Locally, the ridge on the northeastern side of the valley is composed of sandstone and mudstone. Dibblee (2005) shows the site primarily underlain by Quaternary age surficial sediments consisting of sand and gravel of major stream channels and bounded by Quaternary age alluvium consisting of gravel sand and clay of valleys. This mapping is consistent with the materials encountered in our exploratory borings.

It should be noted that the site has been mapped within an area where there has been a historical occurrence of liquefaction or where there is a potential for permanent ground displacements such that mitigation would be required (CGS, 2001) (Figure 7)

3.3 Surficial Soils

The surficial soil in the vicinity of the project location has been mapped by the USDA National Resource Conservation Service (Figure 8). Several soil types have been identified in the vicinity of the site. The mapped surficial soils primarily belong to the Urbanland-Landelspark complex for 0 to 2 percent slopes. The Urbanland-Landelspark complex encompasses the Almaden Lake

shoreline along the northern, eastern, and western boundaries of the lake. These soils are well-drained, runoff is low, and are found in alluvial fans. The soils of the Urbanland-Landelspark complex classify as non-plastic to medium plasticity gravelly loam (GP), sandy loam (SC), and sandy clay loam (CL) which have a low shrink-swell potential.

Soils belonging to the Cumulic Haploxerolls for 1 to 5 percent slopes are located at the southern end of the project site where Alamitos Creek enters Almaden Lake. The Cumulic Haploxerolls soils are well-drained, exhibit very low runoff , and are found in streams. The soils of Cumulic Haploxerolls classify as low plasticity gravelly sandy loam (GP) which have a low shrink-swell potential.

Soils belonging to Urbanland-Clear Lake Complex for 0 to 2 percent slopes are located in the vicinity of the northeast and southeastern portions of the project site. These soils are poorly drained, exhibit lowrunoff, and are found in basin floors. The soils of the Urbanland-Clear Lake Complex classify as medium to high plasticity clays (CL-CH) which have a moderate to high shrink-swell potential.

Soils belonging to the Urban land-Elpaloalto complex for 0 to 2 percent slopes are located in the northwestern corner of the project area. These soils are well-drained, exhibit low runoff, and are found in alluvial fans. The soils of the Urban land-Elpaloalto complex classify as medium to high plasticity clays (CL-CH) which have a moderate shrink-swell potential.

Soils belonging to the Urbanland-Campbell complex for 0 to 2 percent slopes are located in the southwestern corner of the project area. These soils are moderately well-drained, exhibit very low runoff, and are found in alluvial fans. The soils of the Urbanland-Campbell complex classify as low to high plasticity clays (CL, CH) and silt loam (ML) which have a low to high shrink-swell potential.

3.4 Seismicity

The Project is located within the greater San Francisco Bay Area which is recognized as one of the more seismically active regions of California. The right-lateral strike-slip San Andreas fault system controls the northwest-southeast structural grain of the Coast Ranges and the Bay Area. The fault system marks the major boundary between two of earth's tectonic plates, the Pacific Plate on the west and the North American Plate on the east. The Pacific Plate is moving north relative to the North American plate at approximately 40 mm/yr in the Bay Area (WGCEP, 2003).

Studies have shown that the Pacific Plate is slowly moving to the northwest relative to the more stable North American Plate (Page, 1992). The differential movements between the two crustal plates caused the formation of a series of active fault systems within the transform boundary. The transform boundary between the two plates extends across a broad zone of the North American Plate within which right lateral strike-slip faulting predominates. In this broad transform boundary, the San Andreas Fault accommodates less than half of the average total relative plate motion. Much of the remainder in the greater South Bay Area is distributed across the Monte Vista-Shannon, Sargent, Hayward southern extension, Calaveras south, Zayante-Vergeles, Hayward south, Greenville, and San Gregorio fault zones.

The Project is not located within an Earthquake Fault Zone for active faults as designated by the State Geologist (CDMG, 1991). However, the Monte Vista-Shannon fault system has been mapped approximately 2.8 kilometers from the site (CDMG, 1998). The other nearby active faults systems which could induce strong ground shaking at the site include the Sargent, San Andreas, Hayward southern extension, Calaveras south, Zayante-Vergeles, Hayward south, Greenville, and San Gregorio faults. These active faults and their distances from the project site are presented in Table 1 (CDMG, 1998).

A large magnitude earthquake on any of these fault systems has the potential to cause significant ground shaking at the site. The intensity of ground shaking that is likely to occur at the site is generally dependent upon the magnitude of the earthquake and the distance to the epicenter.

Table 1. Distances to Major Active Faults

Fault Name	**Distance and Direction From Site to Fault**
Monte Vista-Shannon	2.8 km south-southwest
Sargent	12.8 km southwest
San Andreas	12.9 km southwest
Hayward Southern extension	13.5 km east-northeast
Calaveras south	17.0 km northeast
Zayante-Vergeles	18.4 km southwest
Hayward south	24 km north
Greenville	38 km northeast
San Gregorio	40 km southwest

3.4.1 Probabilistic Ground Motion

Based on discussions with District staff (Project meeting with District, March 4, 2015), the probabilistic ground motion in the area of the project was assessed for an event having a 39.3 percent chance of being exceeded in 50 years or a return period of 100 years. Using tools contained on the USGS website (USGS, 2008; USGS, 2014), we completed a probabilistic assessment of the earthquake shaking hazard at the site. According to the USGS website for NEHRP Site Class C soils the anticipated peak ground acceleration is 0.24g (see Appendix C).

4. Site Investigation

4.1 Data Review

The District provided CE&G with proposed Alternative 6 and Alternative 7 base drawings, a preliminary boring location map, a base map with existing contours and bathymetric data, and a typical section for Alternatives 6 and 7. CE&G reviewed the project scope and the provided Alternatives 6 and 7 drawings and sections. Published geologic data and information regarding the project from the District website was also reviewed together with geotechnical and geologic information available in our files.

4.2 Field Reconnaissance

CE&G performed an initial field reconnaissance of the site on 7 July 2014. Representatives from the District, the City of San Jose, and Taber Drilling were present. The Project was discussed with emphasis on the Alternative 7 design. A reconnaissance of the site was conducted and observations were made of the proposed land-based boring locations, barge rig launch area, access and environmental constraints, and staging areas. The locations of the proposed borings were adjusted based on observations and discussions in the field.

A second field reconnaissance was performed by CE&G on 2 September 2014. The existing lake levels were observed, potential barge launching issues were identified, the site was marked for Underground Service Alert (USA), and the proposed land-based boring locations were staked. It was determined that utilization of an excavator or backhoe may be required for deployment and/or removal of the barge rig.

4.3 Current Subsurface Exploration

4.3.1 General Scope of Explorations

Seven geotechnical borings were completed for the project. Four borings were drilled on land using truck-mounted drilling equipment and three borings were drilled over-water using a barge-mounted drilling rig. The locations of the borings were selected based on the preferred Alternative 7 site plan provided by the District, our site reconnaissance, evaluation of existing improvements, access, and environmental constraints, and public/pedestrian safety. The locations of the borings are shown on Figures 2 and 3.

4.3.2 Land-based Borings

4.3.2.1 Drilling

The four land-based borings were drilled by Taber Drilling between 8 September 2014 and 9 September 2014 utilizing a CME-55 track-mounted rig using a 6 inch hollow stem auger. The borings were drilled to depths ranging between 50.3 and 51.5 feet below existing grade. Sampling protocol and drilled depths were determined based upon geologic conditions and by materials encountered during the drilling operation. Drilling permits were obtained from the District. Copies of the permits are included in Appendix A.

The boring locations were accessed via roads and trails within the park. Surface conditions at the boring locations varied and consisted of asphalt pavement, gravel surfaces, landscaped, or bare soil. Prior to drilling, CE&G coordinated with the District and the City of San Jose Parks Department regarding selection of the final locations of the borings.

Upon completion, the borings were backfilled with neat cement grout in accordance with the District's permit criteria. Drilling spoils were collected in 55-gallon drums which were labeled and removed and disposed of by Taber Drilling at the end of the drilling operation.

The locations of the completed borings were marked in the field and recorded by measuring with a tape from an established point of reference and using a handheld GPS device.

4.3.2.2 Logging and Sampling

The materials encountered in the borings were logged in the field by a CE&G engineering geologist. The soils were visually classified in the field, office, and laboratory according to the Unified Soil Classification System (USCS) in general accordance with ASTM D2488.

During the drilling operations, soil samples were obtained using one of the following sampling methods:

- California Modified (CM) Sampler; 3.0 inch outer diameter (O.D.), 2.5 inch inner diameter (I.D.) (ASTM D1586)

- Standard Penetration Test (SPT) Split Spoon Sampler; 2.0 inch O.D., 1.375 inch I.D. (ASTM D6066)

The samplers were driven 18 inches (unless otherwise noted) with a 140-pound automatic trip-hammer dropping 30 inches in general conformance with ASTM D6066 procedures. The number of blows required to drive the SPT or CM sampler 6 inches was recorded for each sample. The

results are included on the boring logs in Appendix A. The blow counts included on the boring logs are uncorrected and represent the field values.

It should be noted that, in some instances recovery of a sample was not achieved following the initial driving of a sampler. In order to recover samples for logging and index property testing purposes, a sampler with the addition of a "catcher," or in some cases a smaller diameter sampler, was returned to the top of the previous sampling depth, driven 18 inches, and a sample retrieved. The borehole was then cleaned out to the bottom of the sample interval, or deeper, to obtain the next sample with minimal sluff or in-situ disturbance.

Soil samples obtained from the borings were packaged and sealed in the field to reduce the potential for moisture loss and disturbance. The samples were taken to CE&G's Oakland office for laboratory testing and storage. Selected samples from the borings were also sent to Cooper Testing Laboratories of Palo Alto, California.

4.3.2.3 Soil Conditions Encountered

Relatively uniform soil conditions were encountered in the land-based borings.

- Artificial Fill – The land-based borings encountered between 9 and 19 feet of artificial fill in the locations explored. The artificial fill consisted of variable thicknesses of silt with varying amounts of sand and gravel, lean clay with varying amounts of gravel and sand, well graded sand with gravel and clay, well graded sand with gravel, well graded gravel with sand, silty gravel with sand, asphalt and concrete debris.
    - The density of the granular artificial fill generally varied from medium dense to very dense.
    - The fine grained artificial fill generally varied in consistency from stiff to hard. One exception was a soft silt layer between 8 and 10 feet in Boring LB-2.
- Alluvial Deposits – The artificial fill encountered in the borings was underlain by alluvial deposits to depths explored. The alluvial deposits consisted primarily of granular soils comprised of well graded gravel and well graded sand, poorly graded sand, and silty sand, with a few layers of fine grained soil comprised of sandy silt, silt with sand, sandy clay with gravel, and lean clay.
    - The granular alluvial deposits generally varied in density from medium dense to very dense, with two exceptions noted in a loose silty sand layer in Boring LB-3

between 43 and 48 feet depth and a loose poorly graded sand layer in Boring LB-4 between 33 and 36 feet depth.

- The fine grained alluvial deposits generally varied in consistency from stiff to very stiff.

For a more detailed description of the soils encountered in the borings, the logs of the borings and laboratory test results are included in Appendices A and B.

4.3.2.4 Groundwater Conditions Encountered

The groundwater level was found in the land-based borings (LB-1 through LB-4) to be between Elevation 178.5 and 186 feet (NAVD 88) or between 9 and 18.5 feet below the ground surface. It should be noted that groundwater depth is subject to seasonal fluctuations depending on rainfall, water recharging programs, well pumping, or other factors that may not be evident at the time of our investigation.

4.3.3 Over-water Borings

4.3.3.1 Drilling

The three over-water exploratory borings were drilled by Taber Drilling between 7 October 2014 and 9 October 2014 utilizing a CME-45 barge-mounted drill rig, using a 5-7/8 inch diameter bit rotary wash recirculation system. The borings were drilled to depths ranging between 5-½ and 48-½ feet below existing sediment grade at the exploration locations. Sampling protocol and drilled depths were determined based upon geologic conditions and by materials encountered during the drilling operation. Elevations of samples were maintained by measuring depth of water prior to and during the subsurface exploration. Drilling permits were obtained from the District. Copies of the permits are included in Appendix A.

Access to the site and deployment of the barge and drill rig into the water were performed with the use of an existing boat launch ramp near the southeastern corner of the lake. The launch site was accessed via the eastern parking lot and pedestrian trail. The barge was launched on Monday, 6 October 2014 and remained in the water until the completion of the drilling operation on Thursday, 9 October 2014. It should be noted that a backhoe and/or excavator was not required for deployment or removal of the barge rig from the lake.

Prior to leaving the site at the end of each day, the barge was secured and anchored at the next boring location. The barge was accessed each day via a small boat that was tied off at the launch ramp area. Support equipment was stored overnight at the District's Winfield Boulevard facility.

The exploration locations were established based on coordinates using a handheld GPS device and established visual points of reference.

To avoid the release of drilling fluids into the lake, the borings were completed using a closed circulation system (mud rotary drilling). Casing was utilized to span the depth between the sediment and the deck of the drilling barge. The casing was driven between 5 and 10 feet into the sediment to create a seal at the base of the casing to prevent soil and fluid loss into the lake. Drilling fluid was collected in drums located on the barge and then transferred to a container truck and off-hauled and disposed of by Taber Drilling at the completion of the drilling operation. Copies of analytical test results performed on the soil cuttings and drilling fluid were provided by Taber Drilling and are presented in Appendix A.

The boreholes were backfilled with a cement-bentonite grout at their completion in accordance with District requirements. The grout was placed in the boreholes by the tremie method to within 5 feet of the top of the sediment surface.

The locations of the completed borings were recorded using a handheld GPS device.

4.3.3.2 Logging and Sampling

The materials encountered in the borings were logged in the field by a CE&G engineering geologist. The soils were visually classified in the field, office, and laboratory according to the Unified Soil Classification System (USCS) in general accordance with ASTM D2488.

During the drilling operations, soil samples were obtained using one of the following sampling methods:

- California Modified (CM) Sampler; 3.0 inch outer diameter (O.D.), 2.5 inch inner diameter (I.D.) (ASTM D1586)
- Standard Penetration Test (SPT) Split Spoon Sampler; 2.0 inch O.D., 1.375 inch I.D. (ASTM D6066)
- Shelby Tube (ST) Thin-Walled Tube Sampler; 3.0 inch outer diameter (O.D) (ASTM D1587)

Except for the Shelby Tubes, the samplers were driven 18 inches (unless otherwise noted) with a 140-pound automatic trip-hammer dropping 30 inches in general conformance with ASTM D6066 procedures. The number of blows required to drive the SPT or CM sampler 6 inches was recorded for each sample. The results are included on the boring logs in Appendix A. The blow counts included on the boring logs are uncorrected and represent the field values. For the Shelby Tube sampler, the sampler was hydraulically pushed 24 inches to within 6 inches of each Shelby

Tube's 30-inch length. Each Shelby Tube was pushed into the underlying soil to obtain a relatively undisturbed sample. Some sampling runs were terminated when resistance from the soil was sufficient to reach a limiting hydraulic pressure selected by the driller to avoid damage to the tube and/or sampler. In cases where the underlying material was very soft, an Osterberg piston sampler was used.

It should be noted that, in some instances recovery of a sample was not achieved following the initial driving of a sampler. In order to recover samples for logging and index property testing purposes, a sampler with the addition of a "catcher," or in some cases a smaller diameter sampler, was returned to the top of the previous sampling depth, driven 18 inches, and a sample retrieved. The borehole was then cleaned out to the bottom of the sample interval, or deeper, to obtain the next sample with minimal sluff or in-situ disturbance.

Soil samples obtained from the borings were packaged and sealed in the field to reduce the potential for moisture loss and disturbance. The samples were taken to CE&G's Oakland office for laboratory testing and storage. Selected samples from the borings were also sent to Cooper Testing Laboratories of Palo Alto, California.

4.3.3.3 Soil Conditions Encountered

Relatively uniform soil conditions were encountered in the borings.

- Lake Sediments – The over-water borings indicated that at the locations explored the lake bottom is underlain by between 4 and 11 feet of lake sediments. The lake sediments consisted of variable thicknesses of silts having generally low plasticity with variable amounts of fine sand, peat, and fat clay, all with a very soft (cohesive) or loose (granular) consistency. The silts were judged to behave like loose cohesionless material.

- Alluvial Deposits – The lake sediments encountered were underlain by alluvial deposits to depths explored. The alluvial deposits consisted of well graded gravel, well graded gravel with sand, well graded sand with gravel, silt with variable amounts of sand, sand with variable amounts of silt, and elastic silt.

    - The granular alluvial deposits generally varied in density from medium dense to very dense.

    - The fine grained alluvial deposits generally varied in consistency from stiff to very stiff.

The boundary between the very soft lake sediments and the underlying alluvial deposits is characterized by a distinct increase in relative density.

For a more detailed description of the soils encountered in the borings, the logs of the borings are included in Appendix A and laboratory test results are included in Appendix B.

4.3.3.4 Groundwater Conditions Encountered

Because rotary wash drilling methods were used for the over-water borings, the groundwater level was not measured.

4.4 Geotechnical Laboratory Testing

Laboratory testing was performed to obtain information regarding the physical and index properties of selected samples recovered from the exploratory borings. Tests performed included natural moisture content, dry unit weight, Atterberg Limits, grain size distribution, consolidation, and unconsolidated-undrained triaxial strength testing. Tests were completed in general conformance with applicable ASTM standards. The laboratory testing indicates that the plasticity index ranges between 3 and 36 percent for the samples tested. The results of the laboratory tests are summarized on the boring logs and in Appendix B.

4.5 Environmental Sampling and Testing

Selected samples were retrieved from the upper 10 feet of the sediment encountered in the over-water borings for environmental testing. Samples were collected by CE&G, sealed and placed in a cooler, and retrieved by a representative from Light, Air, and Space Construction (LAS) near the end of each day of the drilling operation. Environmental testing was limited to CAM-17 metals. Results of the environmental sampling was provided directly to the District by LAS and are included in Appendix B of this report.

5. Levee Geotechnical Analysis

5.1 Scope of Analysis

Geotechnical analyses of the planned levee separating Alamitos Creek and Almaden Lake were completed to address the primary geotechnical considerations consisting of seepage, short- and long-term slope static stability, rapid drawdown and seismic stability, and settlement. Design analyses for the levee were completed in general conformance with the guidelines provided in the U.S. Army Corp of Engineers (USACE) engineering manual regarding the design and construction of levees (EM1110-2-1913). The analyses completed include hand calculations and computer modeling to evaluate a range of configurations.

5.2 Liquefaction Analysis

Liquefaction is a soil behavior phenomenon in which a soil located below the groundwater surface loses a substantial amount of strength due to high excess pore-water pressure generated and accumulated during strong earthquake ground shaking. During and immediately following earthquake ground shaking, induced cyclic shear creates a tendency in most soils to change volume by rearrangement of the soil-particle structure. The potential for excess pore-water pressure generation and strength loss associated with this volume change tendency is highly dependent on the gradation and density of the soil, with greater potential in looser generally cohesionless soils. Recently deposited (i.e., geologically young) and relatively loose natural soils, and uncompacted or poorly compacted artificial fills located below the groundwater table, are potentially susceptible to liquefaction.

Saturated granular materials, including fine sands and low-plasticity silts that are potentially susceptible to liquefaction from strong earthquake shaking were encountered in the borings. These conditions were pervasive within the loose lake sediments and sporadic within the generally dense alluvial soils below the lake sediments.

5.2.1 Mapped Seismic Hazards

The Seismic Hazard Zone map prepared by the California Geological Survey (CGS, 2003) for the USGS Santa Teresa Hills and Los Gatos quadrangles indicates that the entire Almaden Lake site and areas adjacent to Alamitos Creek are located within a liquefaction hazard zone. As a result, a liquefaction hazard evaluation was completed.

5.2.2 Probabilistic Ground Motions

A liquefaction assessment for the Alamitos Creek area was performed for the earthquake event having a 10 percent chance of being exceeded in 50 years or a return period of 475 years. Using tools contained on the USGS website (USGS, 2008; USGS, 2014), we completed a probabilistic assessment of the earthquake shaking hazard at the site. According to the USGS website, the anticipated peak ground acceleration is 0.44g from a 6.82 magnitude earthquake (see Appendix C).

Liquefaction analyses were performed on the geotechnical borings using the ground motions listed above.

5.2.3 Analysis Methodology

The liquefaction analysis was completed using methods described by Youd (2001). This empirical method was developed using field observations and laboratory test data in conjunction with results from SPT $(N_1)_{60}$ values. The measured SPT N-values were corrected to $(N_1)_{60}$ as recommended by Idriss and Boulanger (2004). The hammer energy efficiency correction C_E was evaluated by standard penetration energy measurements performed and reported by Taber Drilling, Inc. Further corrections were made for the reported SPT N-values for the effect of overburden pressure, short rod length, non-standardized sampler configuration and borehole diameter. All the correction factors used in the liquefaction analysis are listed below:

$$(N_1)_{60} = N \cdot C_N \cdot C_R \cdot C_S \cdot C_B \cdot C_E$$

where:

C_N = correction for overburden pressure

C_R = correction for short rod length

C_S = correction for non-standardized sampler configuration

C_B = correction for borehole diameter and

C_E = correction for hammer energy efficiency

The index properties of the soil layers including soil classification, unit weight, and percent fines of soil samples obtained from each of the land-based and water-based borings were used to complete the liquefaction analysis. In cases where lab tests were not performed, the soil characteristics were estimated based on lab tests on same or similar soil material at the same depth in nearby borings.

For the purposes of the liquefaction analysis it was assumed that groundwater will be at or near the elevation of the low flow channel or approximately elevation 190 feet.

Liquefaction susceptibility at each boring location was analyzed using the software program LiqIT v4.7.7.5 (GeoLogismiki, 2006). LiqIT takes measured field SPT data and assesses liquefaction potential, and post-earthquake vertical settlement given a user-defined earthquake magnitude and PGA. LiqIT utilizes the NCEER method (Youd et.al., 2001) for liquefaction susceptibility and (Ishihara K, Yoshimine M ,1992) for liquefaction-induced settlement.

5.2.4 Results of Liquefaction Analysis

The results of the liquefaction analysis are presented in Appendix C for boreholes LB-1 to LB-4, WB-1, and WB-2. Each output includes five graphs. The first graph presents SPT blow counts with depth. On the graph the raw SPT blow counts are plotted with $(N_1)_{60}$ corrected blow counts as described above and $(N_1)60_{cs}$ blow counts which are corrected for fines content. The second graph presents the results in terms of Cyclic Stress Ratio (CSR) applied by the earthquake and Cyclic Resistance Ratio (CRR) derived by the available $(N_1)_{60}$ and fines content for each data point. The third graph illustrates the corresponding factor of safety at each SPT value with depth. A factor of safety greater than 1 indicates the material is not liquefiable. The fourth graph presents the calculated settlement of sands with depth and the last graph plots each point on the $(N_1)60_{cs}$ versus the fully adjusted CSR identifying each SPT value as with liquefiable or not liquefiable.

Results of the liquefaction analyses indicate that the lake sediment deposits and some of the deeper sandy soil layers would likely liquefy during an earthquake event with a 100-year return period. Liquefaction induced settlements of about 2 inches were estimated for land-based boring LB-1 and 6 inches in water-based boring WB-2. About 75 percent of the liquefaction induced settlement is indicated to occur in the lake sediment deposits. Liquefaction analyses output are included in Appendix C.

5.3 Levee Configurations

5.3.1 Cross Section Geometry

Based on a consideration of geometry and subsurface conditions, four cross sections were selected for analyses. Two sections were selected for Alternative 7, one at station 10+00 and one at station 12+00. Sections were selected for Alternative 6, at station 2+50 and at station 7+00. The sections were selected based on existing ground surface conditions, levee fill thickness, and maximum fill thicknesses across the Alamitos Creek flood plain. These sections were chosen because they were judged to represent the conservative cross sections in terms of levee and creek back slope height. Each section was analyzed for both the lake side and creek side of the levee based on high water and rapid drawdown conditions for both the lake and creek.

Each of the cross sections analyzed had the same basic geometry consisting of:

- Levee height up to 13 feet tall
- 40 foot wide crest
- 2H:1V side slopes
- Flood plain width of 95 feet
- A 30 feet wide low flow channel
- Creek side high water elevation of 199 feet
- Creek side low water elevation of 188 to 194 feet
- Lake side high water elevation of 190 feet
- Lake side low water elevation of 185 feet

5.3.2 Cross Section Layers

Based on the limited number of geotechnical borings drilled, a uniform subsurface condition was assumed across the lake (Figure 9). The three water-based borings revealed 4 to 11 feet of lake sediment underlain by alluvium. Based on these results, 11 feet of soft lake sediment was assumed to be underlain by alluvium for all cross sections analyzed. The lake sediment layer was divided into two separate layers, with the upper Layer 1 being 5 feet thick and the lower Layer 2 being 6 feet thick. It should be noted that the thickness of the lake sediments may be greater than the maximum thickness observed in our borings.

Anticipated levee construction will include removing Lake Sediment Layer 1 and Layer 2 below the levee footprint down to the underlying stiff alluvium from the toe of the levee on the lake side to the toe of the levee on the creek side. A maximum 1H:1V temporary excavation slope was assumed from the top of the lake sediment layers down to the alluvium layer. It is anticipated that lake sediments located at other portions of the project can remain in place and the material removed from beneath the levee footprint can be relocated as fill at the bottom of the lake where the grades will be brought up to create a flat lake bottom, provided the material meets requirements for general fill outlined in Section 7.1.8. It may be that some of these lake sediments (or at least the upper portion) has too high organic content to use as general fill.

The results of the subsurface exploration indicate that the lake sediments are comprised of weak organic silts, elastic silt, silty sand, and fat clay. As a result, any grading at the lake bottom will be impracticable without first constructing a working layer on which to operate heavy equipment. The cross sections analyzed therefore included a aggregate base working layer comprised of Tensar TriAx TX160 geogrid reinforcement placed on top of lake sediment layer 1

and a 24-inch thick layer of 1-½-inch clean crushed rock in order to construct a firm foundation. For a detailed description of the geogrid reinforcement recommended for use on the project and design and construction of the working layer, refer to Section 7.1.5. A 10-foot thick low permeability clay cap will then be placed across the lake side and creek side of the levee to isolate the mercury laden soils from the flowing creek channel and lake waters. Levee fill material meeting the requirements of the District Levee Safety Technical Guidance Manual (District, 2002) will be used to construct the levee.

5.3.3 Material Properties for Analysis

The primary material properties needed for analysis included unit weights, permeability, and soil shear strength. These were selected as follows:

1. Unit weights for the clayey lake sediment layer 1 and layer 2 were selected based on average values from field and laboratory data and consideration of published typical values for similar materials. Unit weights for the sandy and gravelly alluvium layer were selected based on a comparison of published typical values for similar materials and calculated values based on laboratory water contents and assumed saturated conditions.
2. Permeabilities for cohesive materials located within the lake sediment layer 1 and layer 2 were selected based on calculations from consolidation tests, published typical values for similar materials, and engineering judgment. Permeabilities for the cohesionless alluvium layer were selected based on calculations using the Kozeny-Carmen equations (GEO-SLOPE International, Ltd., 2013) using the laboratory grain size distributions and published typical values for similar materials, and engineering judgment.
3. Shear strengths for lake sediment layer 1 and layer 2 were selected based on a comparison of field pocket penetrometer tests, and typical correlations with SPT values for similar materials.
4. Shear strengths for the sandy and gravelly alluvium layer were selected based on a comparison of laboratory results, and typical correlations with SPT values.

5.4 Seepage Analysis

Under normal flow conditions, water in Alamitos Creek will flow in a low flow channel located approximately 95 feet from the toe of the levee. The District's hydrology and hydraulic analysis indicates that during the 100-year flood event, water will rise briefly against the creek side of the levee with water as high as about 1 foot below the levee crest or elevation 199 feet. The 100-year

flood condition is expected to be temporary and the duration of high water will only be a matter of hours so it is unlikely that seepage will extend more than a few feet into the levee. District staff have indicated they calculated a drawdown time period of 2-¾ hours. However, in accordance with USACE guidelines (USACE, 2000) seepage calculations were completed based on the assumption of steady state conditions. The cross sections used in our analyses were selected to represent the locations of the greatest head differential across the levee.

The SEEP/W module from GeoStudio 2012 (GeoSlope, Ltd., 2013), a two-dimensional, finite-element seepage analysis program, was used to estimate the steady-state pore pressures within and underlying the levee. Steady state exit gradients and the resulting pore pressures were calculated in the analysis for piping potential. The results were also used for modeling the phreatic surface in subsequent slope stability analysis. Seepage analyses were performed for the three cross sections selected for analyses. Representations of the surface and subsurface conditions for seepage analyses of the levee cross sections for Alternatives 6 and 7 cross sections (three total) are provided in Appendix D.

5.4.1 Boundary Conditions

Saturated and unsaturated zone permeabilities are calculated by the SEEP/W program using conductivity functions. General conductivity functions were chosen based on type of soils encountered in the exploratory borings. Typical conductivity functions were then adjusted by SEEP/W to match the input saturated-flow permeabilities.

Either the lake or flow channel and floodplain were considered as upstream and downstream sides of the levee, depending on the modeled water level conditions in the lake and channel. For analysis purposes the side of the levee with the higher water surface elevation was modeled as the upstream side of the levee. The side of the levee with the lower water surface elevation was modeled as the downstream side of the levee. The following boundary conditions were applied to the model:

- A fixed total head boundary condition corresponding to the high water surface elevation was applied along the levee slope.
- A potential seepage face boundary (nodes that allow water to flow out of the model boundary) was applied to the opposite slope of the levee and extended to the ground surface of the levee for the model extents. This allows SEEP/W to estimate a phreatic surface through the levee.

Seepage analysis was conducted for high water surface elevation of 190 feet on the lake side and a potential seepage face on the creek side as well as for a high water surface elevation of 199 feet on the creek side and a potential seepage face on the lake side.

5.4.2 Hydraulic Conductivity (Permeability)

From the grain size distribution of the soil material determined by laboratory testing, the vertical permeabilities of the stratigraphic units, k_v, were estimated within SEEP/W using the Kozeny-Carman equations. From the average of all sand grain size distributions for the alluvium layer, the estimated saturated hydraulic conductivity is 0.01 cm/s. Permeabilities for clayey materials were selected based on calculations from the consolidation tests, published typical values for similar materials, and engineering judgment. A permeability of $1x10^{-6}$ cm/s was assumed for the lake sediment deposits.

A permeability of $1x10^{-6}$ cm/s was assumed for fill to be used during construction of the levee as outlined in the District's Levee Safety Technical Guidance Manual (2002). Additionally, grain size distribution curves, Atterberg Limits, and a compaction curve were obtained from Stevens Creek Quarry for typical levee material that the District has used in the past for construction of these projects. With this data, a more refined hydraulic conductivity function was used based on laboratory test results rather than solely on material type correlations. A permeability of $1x10^{-7}$ cm/s was assumed for the clay cap layer. A soil anisotropy ratio of k_v / k_h of 0.25 was assumed for all naturally deposited layers and engineered fill layers. Material properties used as part of the analysis are summarized in Table 2.

Table 2: Material Properties Used for Seepage Analysis

Material	UCSC Soil Designation	Unit Weight (pcf)	Saturated Conductivity, ky (cm/sec)	k_y/k_x
Levee Fill	CL	127	$1x10^{-6}$	0.25
Clay Cap	CL	123	$1x10^{-7}$	0.25
Aggregate Base	GP	135	$6.0x10^{-3}$	0.25
Lake Sediment Layer 1	ML/MH/CH	93	$1x10^{-6}$	0.25
Lake Sediment Layer 2	CL/SM/MH	93	$1x10^{-6}$	0.25
Alluvium	GW-GM and SW-SM	135	0.01	0.25

5.4.3 Steady State Seepage Analysis

Consistent with USACE guidelines (USACE, 2000), the potential for internal erosion or piping to occur within the embankment, was evaluated by checking if the maximum average exit

gradient at or downstream of the creek side toe is less than 0.5 in a steady-state condition and 0.8 for a distance of 150 feet away from the toe.

Seepage through the levee and under the levee were analyzed using the SEEP/W module contained within the GeoStudio software suite (GeoSlope, Ltd., 2013). The analysis assumed the levee will retain water for sufficient time to develop steady state seepage and resulted in an acceptably low exit gradient on the dry side of the levee. As previously stated, District staff have indicated they calculated a drawdown time period of 2-¾ hours for the 100-year storm waters in Alamitos Creek to recede. It is estimated that is could take upwards of 100 days to reach the steady state condition.

Appendix D includes figure outputs showing the contours of pressure head output from SEEP/W for the three cross sections. The vertical exit gradient is calculated through the blanket layer at the toe of the levee and several feet away from the toe. Additionally, the calculated total exit gradient along the drier side of the levee is plotted versus distance along that side.

The maximum vertical gradient through the blanket layer at the toe of the levee for each section is summarized in Table 3 for the assumed steady state condition. The exit gradient is calculated to be less than 0.5 for all three sections.

Table 3: Vertical Exit Gradients through the Blanket at Toe of Levee

Configuration	Vertical Gradient
Alternative 6 Station 2+50 HWSE Lake Side	0.08
Alternative 6 Station 2+50 HWSE Creek Side	0.23
Alternative 7 Station 10+00 HWSE Lake Side	0.01
Alternative 7 Station 10+00 HWSE Creek Side	0.30
Alternative 7 Station 12+00 HWSE Lake Side	0.05
Alternative 7 Station 12+00 HWSE Creek Side	0.41

5.5 Slope Stability Analysis

The computer program SLOPE/W (GeoSlope, Ltd., 2013) was used to evaluate slope stability. The program utilizes two-dimensional, limit-equilibrium methods to calculate factors of safety along slip surfaces through an embankment. Spencer's method, which satisfies both force and moment equilibrium and is restricted to a constant inter-slice force function, was used for all analyses. By specifying material zones delineated by strength functions, SLOPE/W estimates the normal stresses acting on a potential slip surface to calculate the shear strength along the surface

and compares the strength with estimated (gravity-induced) driving stresses to calculate a factor of safety.

Stability analysis generally followed the procedure described in USACE guidelines (USACE, 2000). Five loading conditions were considered for each of the three cross sections:

- Static Condition
- End of Construction
- Steady State Seepage Condition
- Rapid Drawdown Condition
- Earthquake Condition

The plans show two islands to be constructed within the reconfigured lake, with the adjacent ground surface to be steeper than 2H:1V. Based on our discussions with District staff, we understand these slopes will be constructed using material which complies with the gradation requirements provided in the District's Levee Safety Guidance Manual. Based on soil descriptions and laboratory test results provided to us by Stevens Creek Quarry (a likely source for this material), this material will be comprised of low plasticity sandy clay/clay with sand. By inspection, the current slope configuration surrounding the islands is not considered stable. Consideration should be given to modifying the current design to incorporate 2H:1V side slopes for the islands.

5.5.1 Parameters Used in Stability Analyses

The soil parameters used in slope stability analysis are included in Table 4. Soil strength and unit weights for onsite materials were developed through evaluation of our subsurface exploration and laboratory testing program. The material properties used in our analyses are based on the Levee Fill Material and Impervious Backfill Material requirements set forth for levee fill in the District Levee Safety Technical Guidance Manual (2002), as follows:

- Impervious Backfill Material Requirements
    - Maximum particle size of 1 inch;
    - Consist of clayey material that contains not less than 30 percent by weight of material passing the No. 200 mesh sieve;
    - Plasticity index of not less than 8 percent and a liquid limit not greater than 50 percent;
    - The hydraulic conductivity should be not greater than 10^{-6} cm/sec;
    - Free of organic matter, deleterious substances, and debris.

- Levee Fill Material Requirements
    - Free of organic matter, deleterious substances, debris and rocks or lumps larger than 4 inches in greatest dimension; no more than 15 percent of the rocks or lumps should be larger than 2- ½ inches;
    - At least 75 percent of the material should be finer than No. 4 U.S. Standard Sieve and 50 percent finer than No. 200 U.S. Standard Sieve;
    - Plasticity index between 10 and 20 percent;
    - The hydraulic conductivity should be not greater than 10^{-6} cm/sec.

Table 4: Soil Parameters Used for Stability Analyses

Material	Moist Unit Weight (pcf)	Drained Strength Envelope Results		Undrained Strength Envelope Results	
		Effective Friction Angle, φ' (degrees)	Effective Cohesion, c' (psf)	Friction Angle, φ (degrees)	Cohesion, c (psf)
Levee Fill	127	28	100	0	2000
Clay Cap	123	20	300	0	2000
Working Layer	135	33	0	33	0
Lake Sediment Layer 1	93	0	200	0	200
Lake Sediment Layer 2	93	0	300	0	300
Alluvium	135	35	0	35	0

5.5.2 Static Condition

The static condition considers a situation where the water level in the creek and ground water level are contained to the low flow channel which is approximately 2.5 feet above the channel invert, with the lake at its highest water elevation. The analyses of slope stability for the static condition were performed using effective stress strength parameters.

Seven cases were analyzed, including both lake side and creek side of all three cross sections and the western creek bank located at station 7+00 in Alternative 6. The factors of safety are summarized in Table 5. The factors of safety of levee slope stability for the static condition ranged from 1.8 to 3.2. All exceeded the minimum value of 1.5 recommended for long-term loading in the USACE guidelines (USACE, 2002). The results from the stability analysis and figures illustrating the failure surface and factor of safeties are included in Appendix E.

5.5.3 End-of-Construction

For analysis of the end-of-construction, loading conditions the SLOPE/W analyses incorporated the results from the SIGMA/W module to model the pre-existing in-situ stress conditions and to model the changes in stress conditions as the levee is constructed. For short-term loading a target factor of safety of 1.3 is considered to be acceptable in accordance with the USACE guidelines (USACE, 2002).

Both lake side and creek side stability were evaluated for all three cross sections. The factors of safety are summarized in Table 5. The calculated factors of safety for the end-of-construction condition all meet or exceeded 1.3 and ranged between 1.3 and 1.9. This analysis also assumes that construction of the levee should take a minimum of six weeks to complete. A shorter duration could result in the buildup of excess pore water pressures which could result in a factor of safety less than the target factor of safety of 1.3. The results from the stability analysis along with figures illustrating the failure surface and factors of safety are included in Appendix E.

5.5.4 Long-Term Steady State Seepage Condition

The steady state seepage condition considers a situation where flood water level is sustained long enough to create steady-state flow through the levee, increase pore pressures within the levee and foundation materials, and thereby decrease the strength of the materials. We note that the steady state seepage assumption, though consistent with the state of the practice, is conservative for the levee and levee foundation conditions for the case of the 100-year flood condition identified for the creek side of the levee. The steady state condition for high water surface elevation on the lake side however may occur during the life of the project. Both configurations have been analyzed.

Locations of phreatic surfaces were taken directly from the results of the steady-state conditions developed in the seepage analysis completed using SEEP/W. As defined in the seepage analysis, the design flood level is approximately at 1 foot below the levee crest at elevation 199 feet. The stability computations were performed using effective stress strength parameters. Due to the water pressure against the waterside slope of the levee, for both the high water surface elevation on the lake side and creek side configurations, the waterside of the levee is deemed more stable than the low water side. Therefore, stability analyses under steady seepage were performed only for the low water side of each configuration.

The factors of safety of these three cases are summarized in Table 5. The results indicate that for steady state seepage for both high water surface elevations on the lakeside and creekside conditions are stable, with factors of safety ranging between 1.4 and 1.9. These values meet or exceed the minimum factor of safety of 1.4 recommended in the USACE guidelines (USACE,

2000). The results from the stability analysis along with figures illustrating the failure surface and factors of safety are included in Appendix E.

5.5.5 Rapid Drawdown Condition

The rapid drawdown loading condition considers a situation where the high water surface or flood water level are sustained long enough to create steady-state flow through the levee, and then water levels are quickly lowered, reducing the buttressing effect of the water loads on the waterside slope and increasing the driving stresses on the potential failure surface. It is assumed that drawdown is very fast, and no drainage occurs in materials with low permeability. A combination of effective stress strength parameters and undrained shear strength parameters were used and two different phreatic surfaces modeled. The first phreatic surface represents the pore-water pressure condition before rapid drawdown, in this case the 100 year flood condition. The second phreatic surface represents the pore-water pressure condition after rapid drawdown.

Each cross section was analyzed for rapid drawdown cases resulting from drawdown of the lake side and creek side configurations. Only the side of the levee where the high water surface elevation drops rapidly was analyzed for slope stability.

The factors of safety of the three cross sections and both cases of high water on the lake side and creek side are summarized in Table 5. The results show that under rapid drawdown conditions the levee is stable, with factors of safety ranging between 1.2 and 1.6. These values meet the minimum factor of safety of 1.2 outlined in the USACE levee guidelines. The results from the stability analysis along with figures illustrating the failure surface and factor of safeties are included in Appendix E.

5.5.6 Seismic Stability Condition

The USACE levee guidelines do not specifically address the method to be used to analyze seismic stability for levees. Therefore, pseudo-static seismic slope stability analyses have been completed using a pseudo-static coefficient determined according to the methods described in the 2008 California Geologic Survey document SP117A titled, “Guidelines for Evaluating and Mitigating Seismic Hazards in California.” The method is commonly used for evaluating seismic slope stability of embankments. As part of the method the mean moment magnitude and peak ground acceleration are used in selection of the pseudo-static seismic coefficient. These parameters are determined from a probabilistic seismic hazard deaggregation to determine the peak ground acceleration and moment magnitude for the earthquake event having a 39 percent chance of being exceeded in 50 years or return period of 100 years. Output of the deaggregation performed at the location of the project resulted in an estimated peak ground acceleration of

0.24g occurring from a 6.67 magnitude earthquake. Based on the results from the SP117A evaluation a pseudo-static coefficient of 0.10 was chosen for the analysis (Appendix E).

Seismic slope stability analyses were completed using both effective stress and undrained shear strength parameters with low water surface elevations for both the lake and creek side. The pseudo-static factors of safety determined for the three cross sections analyzed are summarized in Table 5. The results indicate that the levee has pseudo-static factors of safety that meet or exceed 1.0 with values ranging between 2.2 and 4.2 using undrained shear strength parameters and between 1.4 and 1.8 using effective stress parameters. The results from the stability analysis along with figures illustrating the failure surface and factors of safety are included in Appendix E.

Table 5: Factors of Safety from Stability Analyses

Configuration	Calculated Range of Factors of Safety by Loading Case									
	Static (Normal Water Elevation)		End of Construction		Static Steady Seepage		Rapid Drawdown		Seismic (Normal Water Elevation)	
Levee Side	Lake	Creek	Lake	Creek	Lake	Creek	Lake	Creek	Lake*	Creek*
Alt 6 STA 2+50	1.9	1.9	1.3	1.4	1.6	1.9	1.8	1.3	3.1/1.5	2.9/1.5
Alt 6 STA 7+00	N/A	3.2	N/A	N/A	N/A	N/A	N/A	2.8	N/A	2.23
Alt 7 STA 10+00	1.9	2.3	1.6	1.8	1.5	2.3	1.6	1.7	2.6/1.4	3.6/1.5
Alt 7 STA 12+00	1.8	2.4	1.4	2.0	1.6	2.4	1.2	1.3	2.6/1.4	4.2/1.8

*Undrained shear strength factor of safety / Effective shear strength factor of safety

5.6 Settlement Analysis

5.6.1 Static Settlement

Based on the results from the subsurface exploration within Almaden Lake it was determined that the sand and gravel alluvium underlying the lake sediments would likely experience immediate settlement during the construction process. As a result laboratory consolidation testing was performed only on the organic silt, plastic silt, and fat clay lake sediment deposits overlying the alluvium layer. Two consolidation tests were performed on the lake sediment deposits obtained from the water-based borings. Based upon evaluation of the results, the following consolidation parameters were developed for evaluation of settlement.

Table 6: Consolidation Parameters

Material	Cc'	Cr'	Cv (ft^2/yr)
Lake Sediment Layer 1	0.18	0.06	15 to 75
Lake Sediment Layer 2	0.22	0.02	170 to 280

Settlement analyses were completed using both hand calculations and using the computer program SIGMA/W within the GeoStudio software suite. The results from hand calculations were used to calibrate the SIGMA/W analysis so that the amount of settlement along the entire cross section could be determined. The results from these analyses indicate that, if the levee is constructed over the lake sediments, the levee fill placed over 11 feet of lake sediment could settle up to 21 inches. The results from the hand calculations and GeoStudio analysis are included as Appendix F and presented in Table 7. The calculations indicate settlements assuming the lake sediments are removed from beneath the levee and capped with a minimum of 10 feet of fill within the lake, low-flow channel, and adjacent flood plain.

Table 7: Settlement Estimates

Alternative and Station	Location	Thickness of Fill Placement (feet)	Range of Calculated Settlement (inches)*
Alternative 6 at Station 2+50	Lake	9 to 14	6-½ to 10
	Levee	15 to 32	¼ to ½
	Low Flow Channel	8 to 11	6-½ to 7-½
	Flood Plain	10 to 14	6-½ to 9
Alternative 7 at Station 10+00	Lake	5 to 7	< ¾
	Levee	14 to 32	¼ to ½
	Low Flow Channel	15 to 19	13-¼ to 13-¾
	Flood Plain	15 to 25	13-¼ to 17-½
Alternative 7 at Station 12+00	Lake	5 to 7	< ¾
	Levee	16 to 30	< ½
	Low Flow Channel	9 to 11	12 to 12-½
	Flood Plain	13 to 19	7 to 12-½

* Calculated at 95% consolidation settlement

These calculated settlements are based on the soil parameters outlined above and presented in detail in Appendix F. The settlement values should be considered when calculating fill quantities and cambers for the final grades.

5.6.2 Seismic Settlement

As described above in Section 5.1.4, earthquake-induced settlement is calculated to be up to about 6 inches due to densification of underlying sand and lake sediment layers.

5.6.3 Rate of Settlement

Based upon the November 2014 consolidation tests, the coefficient of consolidation, Cv is estimated to be 15 to 75 ft^2/year for the upper layer of the lake sediments and 170 to 280 ft^2/year for the lower portion of the lake sediments. Using these values, it is estimated that an 11-foot thick lake sediment layer would take between 1.5 months to 2.3 years to reach 95% total settlement due to consolidation.

5.7 Levee Embankment Erodability

The erodability of the levee embankment was evaluated using methods outlined in USACE Hydraulic Design of Flood Control Channels Manual EM 1110-2-1601. Hydraulic design values of Alamitos Creek used in the evaluation were provided by the District. Based on the flow velocities provided by the District, it is anticipated that creek channel velocities will be in excess of the anticipated maximum velocity for nonerodible channels constructed using the proposed levee fill material.

The proposed levee fill material will consist of sand, silt, and clay, and would be capable of resisting erosion due to channel flow velocities of up to 6 ft/s. The District's hydraulic design values (shown in Table 7 below) include a flow velocity adjacent to the bank of 8 ft/s for flows ranging from 300 cfs for the 100-year storm with 8,250 cfs. Analyses have been performed to determine the size of rock slope protection (RSP) to resist erosion of the creek banks for this design velocity.

Table 7: Hydraulic Design Values

Design Flow (cfs)	Max Levee Height (ft)	Bank Velocity (ft/s)	Water Surface Depth (ft)
Q_{100} 8250	15	8	11.5
Q_{10} 3400	15	2	5
1000	15	1	5
300	15	1	4

Design of the RSP was performed using the "California Bank and Shore Rock Slope Design," third edition (2000) as recommended in the District's Levee Safety Technical Guidance Manual. The analysis requires the channel flow velocity adjacent to the creek bank and channel geometry to calculate the size of RSP. Based on the flow velocity of 8 ft/s provided by the District and determining if the channel flow was impinging or parallel, two RSP design sections were determined.

For impinging flow the design section includes a total RSP thickness of 2 feet of facing class rock underlain by Caltrans Type A RSP fabric. For parallel flow the design section includes 0.75 feet of Backing No. 3 rock underlain by Caltrans Type A RSP fabric. Alternatively, an erosion resistant planting scheme may be contemplated, provided the landscape architect approves. The results from this analysis area included in Appendix G.

Based on the channel profiles outlined in Alternative 6 and 7 the current meandering channel geometry would be between impinging flow and parallel flow. Additionally, the District may elect to incorporate plantings as part of the levee development. While plantings will provide some erosion protection, the portions of the levee with plantings may exhibit greater erosion than if protected by rock, and may require a greater level of maintenance. The final design section would be dependent on the level of protection the District desires.

6. Conclusions

6.1 General

Based on the results of our geotechnical investigation, it is our opinion that the proposed Almaden Lake Improvement Project may proceed as currently contemplated and as shown in the District preliminary drawings for either Alternative 6 or Alternative 7.

6.2 Foundation Conditions

The upper 4 to 11 feet of the upper lake sediments are very soft, fine grained soils, some with a very high organic content. This material is highly compressible and has a low shear strength. In addition, the sediments are susceptible to liquefaction. To provide adequate support for the new levee, we recommend that the lake sediment materials be removed in the area the levee is to be constructed. It should be noted that, while we observed the thickness of the very soft lake sediments to vary from 4 to 11 feet, these measurements were taken in only three locations. The actual thickness of soft sediments will likely vary outside this range and may be thicker locally.

The process of draining the lake and exposing the soft lake sediments to drying will likely result in some increase in shear strength of those soils. We have not evaluated the effects of drying and resulting strength increase, and have not included this effect in our analysis. There are a number of influencing factors that involve the construction methods employed that are currently unknown. However, it should be noted that there will likely be some volume loss resulting from the drying of the soils, which should be considered in the grading volume calculations.

6.3 Levee Stability

The current design plans show the new levee to have slope gradients of approximately 2 to 1 (horizontal to vertical). Based on the estimated shear strength of the levee fill material (effective friction angle of 28 degrees and effective cohesion of 100 psf), our analyses indicate slope gradients of 2 to 1 to be stable, including for a saturated condition. It should be understood that our analysis is based on material properties of the levee fill material described in the District's Levee Safety Technical Guidance Manual, as well as laboratory tests for typical levee fill material provided by Stevens Creek Quarry. The assumed material properties that our analyses are based on will need to be verified during construction.

6.4 Groundwater

The groundwater level was found in the land-based borings (LB-1 through LB-4) to be between Elevation 178.5 and 186 feet (NAVD88). The normal lake water level is at approximately 190 feet. The deepest elevation at which earthwork will be required is approximately 150 feet. Therefore, dewatering may be required after the lake has been drained. It should be noted that groundwater depth is subject to seasonal fluctuations depending on rainfall, water recharging programs, well pumping, or other factors that may not be evident at the time of our investigation.

6.5 Erosion

Our analyses indicate that based on the maximum flow velocity in the creek channel, slope protection should be provided on the creek side slope of the new levee. Recommendations are provided below for Rock Slope Protection.

6.6 Seismic Hazards

The very soft lake sediments are considered to be susceptibility to liquefaction during strong earthquake ground shaking. For this reason, recommendations are provided below for mitigation of the liquefaction hazard, which include removal of the soft lake sediments within the foundation footprint of the new levee.

For other areas outside the levee embankment construction, the soft lake sediments are likely present across the entire lake bottom and are planned to be left in-place and overlain by a "capping" clay soil layer. The in-place sediments will underlay any new fill placed to raise the grade of the lake bottom. This includes the two islands to be constructed in the east portion of the lake and the Alamitos Creek low-flow channel. If the soft lake sediments were to liquefy or lose strength during an earthquake, this would likely result in settlement of the overlying ground surface and ground cracking. Although the levee would be expected to remain in a stable condition, seismically-induced effects could include some settlement and ground cracking of the island, low flow channel, and other areas underlain by the soft sediments. Such ground movements would require some level of repair.

7. Recommendations

7.1 Earthwork

Earth work items anticipated for this project include the following:

- Draining the lake;
- Clearing, stripping, and demolition;
- Removal and disposal of designated methylmercury-laden soils;
- Excavation of on-site soil to conform to finish grades;
- Import of fill;
- Placement of excavated on-site material and imported fill to raise grades to conform to finish grades, e.g. where the lake bottom will be raised;
- Construction of a "working platform" on which to operate heavy equipment atop the soft sediments;
- Construction of a clay cap layer over the methylmercury-laden soils remaining in-place;
- Construction of a levee that separates the lake from Alamitos Creek;
- Construction and reshaping of the islands;
- Reconfiguration/construction of the westerly park area;
- Construction of Alamitos Creek low-flow channel.

7.1.1 Draining the Lake

Prior to initiating earthwork at the site, Almaden Lake will need to be drained and Alamitos Creek will need to be diverted. The design of the lake dewatering and creek diversion should be made the responsibility of the contractor based on criteria provided by the District.

After the lake has been drained and creek flows diverted, the sediments on the bottom of the lake will be in a soft and wet condition. The amount of time required for these sediments to dry out to the point at which heavy equipment may be operated over them will be dependent on a number of factors, including temperature and wind. Earthwork operations, including the removal of methylmercury-laden sediments, will be hindered by the soft, wet soil conditions. To facilitate the earthwork operations, including contaminated soil removal and construction of the levee, it is anticipated that a temporary "working platform" on which to operate earthwork equipment will need to be constructed. Recommendations are provided below for a working surface. In addition to or alternatively, the use of light ground pressure equipment, such as a "mud cat" with a blade, will be needed to fluff the wet, soft lake sediments to aid in drying and further processing.

Recommendations for the handling and removal of the methylmercury-laden sediments will be provided by others.

7.1.2 Construction Dewatering

The lake will need to be drained to accomplish the construction. There is a potential for shallow or perched groundwater to be present during construction operations. Dewatering that may be required in the excavation for the levee foundation may be accomplished using sump pumps placed at the base of the excavation. However, the success of such an approach will depend largely on the contractor's ability to properly monitor and maintain the system. Should well points be required, the dewatering system should be designed and installed by an experienced dewatering contractor. It is recommended that the groundwater level be maintained at least 2 to 3 feet below the bottom of the excavation.

The existing flow in the Alamitos Creek channel will be required to be diverted away from the construction operation to facilitate the earthwork operations. A cofferdam or temporary pipe system may be constructed to accomplish diversion of the creek waters.

7.1.3 Clearing and Demolition

Prior to construction, areas to be graded should be cleared of designated existing improvements, deleterious materials, debris, obstructions, and stumps and primary roots of trees and brush (roots over 1 inch in diameter or longer than about 3 feet in length). Holes, depressions, and voids that extend below the proposed finish grade should be cleaned and backfilled with engineered fill compacted to the recommendations in this report. Abandoned utilities encountered during grading should be removed in their entirety.

After clearing, surface vegetation and organic laden soils should be stripped. Organic laden soils are defined as soils with more than 3 percent by weight of organic content. This may include the bird waste-laden sediments at the lake bottom. The required stripping depth should be determined in the field by the geotechnical engineer at the time of construction. Stripped material may be stockpiled for use in landscape areas if approved by the project landscape architect, or otherwise removed from the site.

7.1.4 Removal of Lake Sediment

All lake sediment within the foundation footprint of the new levee should be removed from the levee foundation area as shown on Figure 9. The final depth of sediment removal should be determined by the project geotechnical engineer during earthwork operations. Based on our subsurface exploration, it is estimated that the depth of soft lake sediments varies from 4 to 11

feet in the foundation area of the new levee. The base of the soft lake sediments is characterized by a distinct increase in density/consistency of the underlying alluvial sediments. It should be noted that this depth range is based on three boring locations and that the actual depth of soft sediments at the bottom of the lake will likely vary outside this range. Therefore, it is recommended that the District utilize appropriate measurement and payment clauses in the earthwork bid items to account for this anticipated variability.

The soft lake sediments consist of fine grained soils with an undrained shear strength of less than approximately 500 psf. In addition, they may contain abundant organic material originating from bird waste.

The need for removal of the soft lake sediments from other areas besides under the levee should be based on the expected or desired performance of the fill placed in these other areas and should be determined by the District.

A significant amount of the soft lake sediments are anticipated to contain elevated levels of mercury. The disposition of these soils will be determined by others, including the permissibility of leaving these soils on-site below the planned clay cap and the requirement for disposal of some of the sediments.

7.1.5 Working Surface

The new levee will be constructed over the soft lake sediments. It is likely that, due to schedule constraints, there will not be sufficient time to allow the lake sediments to dry out enough to allow heavy equipment over them. In order to facilitate operation of earthwork equipment over these soft soils, a working surface will likely need to be constructed. We currently anticipate a working surface may be constructed by placing a geogrid over the lake sediments, such as Tensar TriAx TX160, and placement of 24 inches of 1-½-inch clean crushed rock. A geotechnical engineer should be contacted to provide additional recommendations for design of a working surface or subgrade stabilization, depending on the conditions encountered during construction and the project's requirements and restrictions.

7.1.6 Excavation

Excavations for the site will include removal of existing improvements, removal of contaminated soil, excavation for the base of the new levee, excavation of existing fill soil, and trenching for proposed conduits through the levee. It is judged that the excavations can be accomplished with conventional earthwork equipment such as excavators, backhoes, dozers, and loaders.

Because of the very low strength of the soft lake sediments and lack of an overlying confining layer, the requirement for shoring of excavations made in this material should be carefully evaluated during construction by the contractor. Contractors should be made aware that excavations should be sloped back or shored as necessary to provide safe working conditions. All excavations and shoring systems should meet the minimum requirements given in the State of California Occupational Safety and Health Standards, latest edition. Stability of all temporary excavations should be made contractually the responsibility of the contractor.

Temporary cut slopes for unshored excavations greater than 4 feet deep should be sloped back at an inclination no greater than 1:1 (horizontal to vertical). Temporary cuts made in excavated lake sediments may need to be flattened to 2:1 (horizontal to vertical) or flatter, depending on conditions encountered, due to their soft, and in some cases, loose, granular nature.

Temporary surcharge loads, including storage of construction supplies and operation of construction equipment, above the excavation should be considered in the final shoring design.

Groundwater was encountered during our investigation at between elevation 178.5 and 186 feet and will likely be encountered during the construction operation. Contractors should be made aware of the fact that the groundwater will likely complicate earthwork construction and, depending on the time of year, adjustments in the field may be necessary (e.g. subexcavation and removal of wet and soft material, installation of temporary drainage around excavations, etc.).

7.1.7 Subgrade Preparation

Subgrade soil in areas to receive engineered fills should be scarified to a minimum depth of 8 inches; moisture conditioned to about 1 to 3 percent above the laboratory optimum moisture content (as determined by ASTM D1557), and compacted to the recommendations given provided in Section 7.1.9. Prepared soil subgrades should be non-yielding when proof-rolled by a fully loaded water truck or equipment of similar weight, as approved by the geotechnical engineer. After the subgrade has been properly prepared, the area may be raised to design grades by placement of engineered fill.

Soil with moisture content above optimum value should be anticipated, given the wet environment at the site. Unstable, wet or soft soil will require processing before compaction can be achieved. If the construction schedule does not allow for air-drying, other means of creating a stable subgrade, such as lime or cement treatment, excavation and replacement, geogrids or geotextile fabrics may be considered. The method to be used should be determined at the time of construction based on the actual site conditions. It is recommended that unit prices for subgrade stabilization be obtained during the construction bid process.

7.1.8 Fill Materials

It is anticipated that fill materials for the project will include the following soil types:

- Foundation Layer or "Working Platform" – graded rock to be used, where necessary, to create a working surface for heavy equipment.
- Clay Cap – imported soil to be used as a low permeability barrier over the mercury-laden sediments in the lake. The clay cap material may be the same material as the Levee Fill Material provided it meets the requirements for permeability assumed in our analyses. In accordance with the District's Levee Safety Technical Guidance Manual, the Clay Cap material (referred to in the Manual as "Impervious Backfill Material"), should be as follows:
    - Clay Cap thickness shall be at least 5 feet in all areas. Where the clay cap is within 150 feet of the toe of the lakeside of the levee, the clay cap shall be a minimum of 10 feet thick. Alternatively, the upper 5 feet of the clay cap, where it is 10 feet thick, may be comprised of Levee Fill Material (see below);
    - Maximum particle size of 1 inch;
    - Consist of clayey material that contains not less than 30 percent by weight of material passing the No. 200 mesh sieve;
    - Plasticity index of not less than 8 percent and a liquid limit not greater than 50 percent.
    - Hydraulic conductivity of 10^{-6} cm/sec or less;
    - Free of organic matter, deleterious substances, and debris.
- Levee Fill Material – imported soil used to construct the levee. In accordance with the District's Levee Safety Technical Guidance Manual, the requirements for Levee Fill Material (referred to in the Manual as "Fill Materials for Levee"), are as follows:
    - Free of organic matter, deleterious substances, debris and rocks or lumps larger than 4 inches in greatest dimension; no more than 15 percent of the rocks or lumps should be larger than 2- ½ inches;
    - At least 75 percent of the material should be finer than No. 4 U.S. Standard Sieve and 50 percent finer than No. 200 U.S. Standard Sieve.
    - Plasticity index between 10 and 20 percent;
    - Hydraulic conductivity of 10^{-6} cm/sec or less.

7.1.9 Engineered Fill Placement and Compaction

Following the removal of the soft lake sediments from within the footprint of the proposed levee, the top of the older alluvium should be exposed. The upper 8 inches of alluvial soils should be scarified and moisture conditioned to between 1 and 3 percent above optimum moisture content, and compacted to no less than 95 percent relative compaction, based on ASTM D1557, latest edition. This compacted soil layer will serve as the base of the levee foundation.

Following the preparation of the base layer of the levee foundation, engineered fill should be placed in horizontal lifts each not exceeding 8 inches in thickness before compaction, moisture conditioned to between 1 and 3 percent above the laboratory optimum moisture content, and mechanically compacted to no less than 92 percent relative compaction. Moisture conditioning of soils should consist of adding water to the soils if they are too dry and allowing the soils to dry if they are too wet.

Due to the anticipated settlement of the soft lake sediments from placement of overlying fill, a camber (additional fill thickness) should be incorporated into the levee design. The settlement estimates provided in Section 5.6.1 should be used for guidance in determining an appropriate design camber.

Fill slopes should not be constructed steeper than 2H:1V including the levee side slopes, creek embankments, and island side slopes.

The upper 8 inches of the subgrade on the top of the levee should be compacted to no less than 95 percent relative compaction. Aggregate base in pavement areas should also be compacted to no less than 95 percent relative compaction at slightly above the optimum moisture content.

7.1.10 Proximity to Existing Structures

Based on the current plans for Alternatives 6 and 7, there does not appear to be significant structures adjacent to the area of improvements that will require protection during the construction of the proposed improvements.

7.1.11 Erosion Protection

Where Rock Slope Protection (RSP) is desired to limit the amount of erosion on the new levee slopes, the following recommendations should be considered.

For impinging flow conditions, the design section should include a total RSP thickness of 2 feet of facing class rock underlain by Caltrans Type A RSP fabric. For parallel flow conditions, the design section should include 0.75 feet of Backing No. 3 rock underlain by Caltrans Type A RSP

fabric. Alternatively, an erosion resistant planting scheme may be utilized, provided the landscape architect approves.

7.2 Headwall Design Parameters

A headwall structure is planned for the inlet and outlet culvert pipes through the new levee and into the lake. The exact locations of these structures has not yet been determined. However, one will be located near the south end of the new levee and the other will be located near the north end of the new levee. It is anticipated that both structures will be constructed within levee fill. Vehicular traffic is expected over the culvert and should be considered in the culvert design. The headwall may be designed using the following recommendations.

7.2.1 Headwall Foundation Design

The proposed culverts headwalls may be supported on conventional footing foundations or mat slab foundations bearing on competent undisturbed native alluvial soil material (below the soft lake sediments) or engineered fill. Compaction of soil subgrades and engineered fill should be as recommended in Section 7.1.

For dead plus live loads, footings may be designed using a net allowable bearing pressure of 2,500 pounds per square foot (psf). The allowable bearing value may be increased by one-third when considering short-term loads such as wind and seismic forces. Reinforcement for the foundations should be determined by the project structural engineer.

Footings should be a minimum of 12 inches wide and should be embedded a minimum of 2 feet below the lowest adjacent grade or the anticipated depth of scour, whichever provides a deeper embedment.

Mat slabs should have a thickened perimeter extending to a minimum of 2 feet below the lowest adjacent grade or the anticipated depth of scour, whichever provides a deeper embedment.

Resistance to lateral loads may be developed from a combination of friction between the bottom of foundations and the supporting subgrade, and by passive resistance acting against the vertical sides of the foundations below the anticipated scour zone. For design, an friction coefficient of 0.35 between the foundations and supporting subgrade, and an passive resistance of 325 pounds per cubic foot (pcf, equivalent fluid weight) acting against the embedded sides of the foundations below the scour zone may be assumed. It should be noted that the passive resistance value is only applicable where the concrete is placed directly against undisturbed soil (the soft lake sediments do not apply) or engineered fills. Voids created by the use of forms should be backfilled with property compacted engineered fill or with concrete.

7.2.2 Lateral Earth Pressures

The headwalls and wing walls for the proposed culverts will be up to about 10 feet tall. The walls should be designed to resist static earth pressures due to the supported soil and surcharge pressures induced by exterior loads on the walls. Lateral pressures will depend on whether wall movements are allowed or desired, backfill type, backfill slope gradient, magnitude of external loads, design water elevation, and subsurface drainage provisions. The walls should be designed using the lateral pressures presented below, which are expressed as equivalent fluid weights for level backfill slope.

Soil Pressure	Normal Condition[1]	Rapid Drawdown[2]
Level Backfill Slope		
At-rest[3]	65 pcf	95 pcf
Active[4]	45 pcf	85 pcf
Passive[5]	325 pcf	325 pcf
Sloping Backfill		
At-rest[3]	88 pcf	108 pcf
Active[4]	68 pcf	98 pcf
Passive[5]	325 pcf	325 pcf

Notes:

1. Normal condition assumes water is below foundation on both water and land sides of wall.
2. Rapid drawdown condition assumes water on water side is below wall foundation level and water on land side is at high flood water level.
3. Walls that can tolerate very little or no movement, or walls where movement and settlement of the backfill associated with active soil condition is not desirable, should be designed using at-rest soil pressure.
4. To develop active soil pressures, wall movements of about 0.005H to 0.01H would be necessary for cohesive soils and 0.005H for cohesionless soils.
5. To develop passive soil pressures against wall footings, horizontal movement of up to about $0.04D_f$ would be necessary for cohesive soils and $0.005D_f$ for cohesionless soils, where D_f is the footing embedment depth.
6. Additional surcharges such as traffic and traffic impact force should be included in the design by the project structural engineer.

7.3 Additional Design Considerations

7.3.1 Settlement Monitoring

The settlement analysis indicates that the consolidation settlement of the soft lake sediments that will remain in the area beneath the low-flow channel and adjacent flood plain will take between 1.5 months and 2.3 years to reach 95% total settlement due to consolidation. Therefore, we

recommend a settlement monitoring program be implemented during construction to provide information on the actual rate and amount of settlement exhibited to provide an estimate for the completion of settlement and to provide guidance on the recommended thickness of camber for the clay cap. Should the settlement prove to continue beyond the construction period, a provision should be made to evaluate the site grades after 95% consolidation has been reached and to make adjustments to the grades, if necessary.

Settlement monitoring plates with vertical riser pipes should to be installed during construction according to construction documents and before any fill is placed. The plate should be ¼-inch thick steel approximately 2-feet square and the pipe should be 2-inches in diameter. The pipe should be threaded so that extensions may be added as the fill thickness is increased. The locations of the settlement plates should be surveyed prior to placement of fill, and periodically during and following fill placement. The frequency of monitoring will depend on the rate at which fill is placed, but should be made at least once per week or as directed by the Geotechnical Engineer.

If the measured settlement is less than predicted, then the design camber can be reduced. If the measured settlement is greater than predicted, the camber should be increased accordingly. In no case should be levee side slopes be steepened to adjust for differences between the predicted and the actual settlement.

8. Limitations

The conclusions and recommendations of this report are based upon information provided to us regarding the proposed improvements, our geologic reconnaissance, subsurface conditions described on the boring logs, the results of the laboratory testing program, interpretation and analysis of the collected data, and professional judgment.

It is the District's responsibility to ensure that the recommendations contained in this report are brought to the attention of the architect, engineers, and contractors working on the project. Furthermore, it is the District's responsibility to make sure that these recommendations are carried out during the design and construction phases of the project.

Site conditions described in the text of this report are those existing at the time of our last field reconnaissance in October 2014 and are not necessarily representative of the site conditions at other times or locations.

Unanticipated soil conditions are frequently encountered during construction and cannot be fully determined by excavating a limited number of exploratory borings. Additional expenditures may be required during the construction phases of the project as conditions vary. It is recommended that a contingency fund be established to cover potential adverse soil and groundwater conditions which may be encountered during site development. If it is found during construction that subsurface conditions differ from those described on the logs of the borings, then the conclusions and recommendations in this report shall be considered invalid, unless the changes are reviewed and the conclusions and recommendations modified and approved in writing by Cal Engineering & Geology, Inc.

The findings of this report should be considered valid for period of five years unless the conditions of the site change. After a period of three years, CE&G should be contacted to review the site conditions and prepare a letter regarding the applicability of this report.

Cal Engineering & Geology, Inc. should be accorded the opportunity to review the 90 percent plans and specifications to determine if the recommendations of this report have been implemented in those documents. The recommendations of this report are contingent upon this stipulation.

Field observation and testing services are essential parts of the proposed project. It is important that Cal Engineering & Geology, Inc. be retained to observe the earthwork, foundation drilling and excavation, and other relevant construction operations. The recommendations of this report are contingent upon this stipulation.

The evaluation or identification of the potential presence of hazardous materials at the site was not requested and is beyond the scope of this project.

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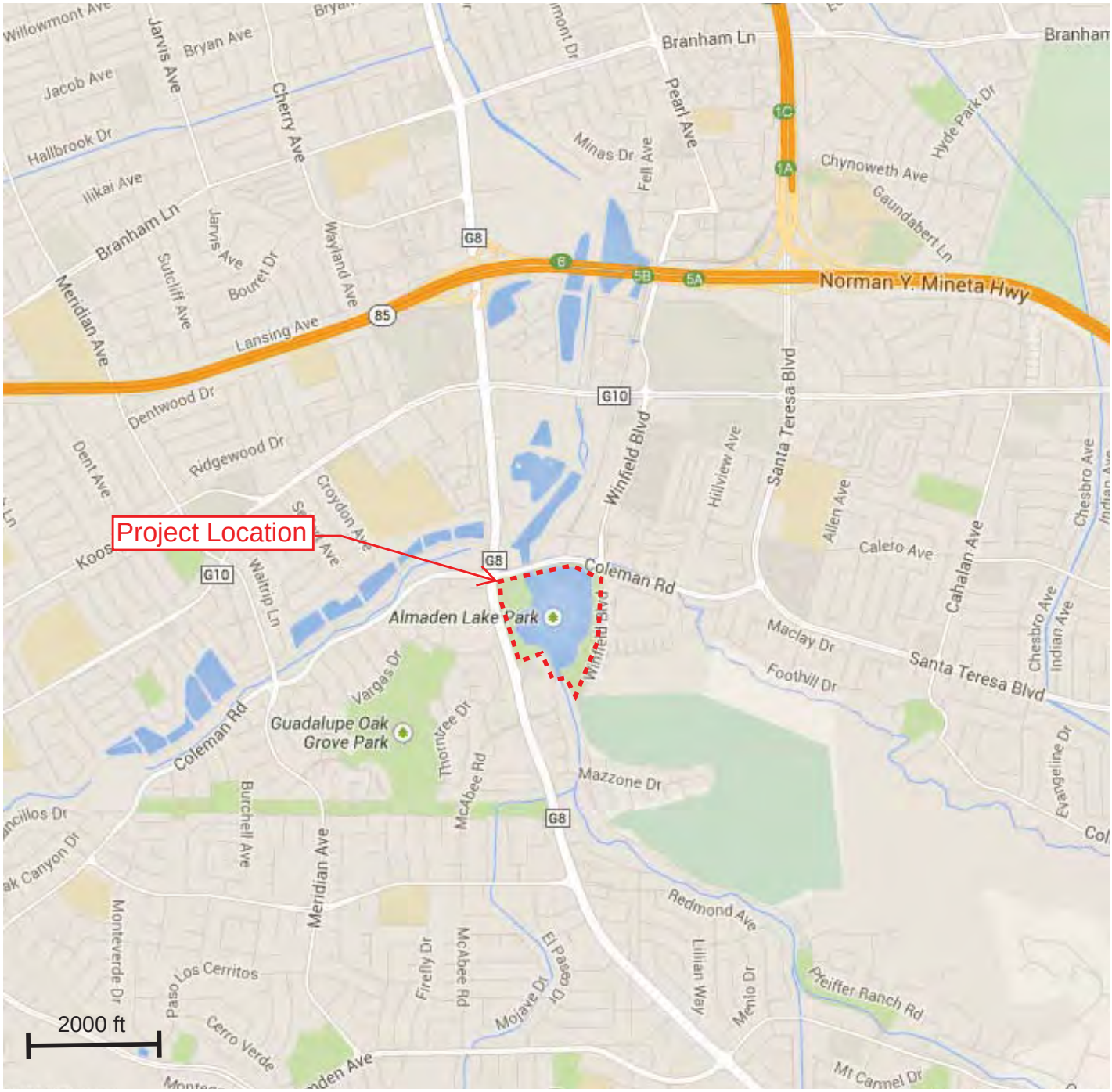
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FIGURES



SOURCE: GOOGLE MAPS, 2014

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SANTA CLARA VALLEY WATER DISTRICT
ALMADEN LAKE IMPROVEMENT PROJECT
SAN JOSE, CALIFORNIA

SITE LOCATION MAP

JOB NO. 140540	APRIL 2015	FIGURE 1

NOTES

1. BASEMAP TAKEN FROM PLANS TITLED, "ALMADEN LAKE IMPROVEMENT PROJECT," PREPARED BY SANTA CLARA VALLEY WATER DISTRICT, PROJECT NO. 26044001.

WINFIELD BOULEVARD

COLEMAN ROAD

ALMADEN LAKE

NEW ISLAND

NEW ISLAND

NEW LEVEE

NEW LEVEE

ALAMITOS CREEK

A-LINE, LOW FLOW CHANNEL

A-LINE, LOW FLOW CHANNEL

ALMADEN EXPRESSWAY

LB-1

WB-1

LB-2

WB-3

WB-2

LB-3

LB-4

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 17+77

4+50 6+50 10+50 14+50 16+50

SCALE 80 0 80 160 200 FEET

LEGEND

LB-4 BORING LOCATION (LAND)

WB-3 BORING LOCATION (WATER)

16+50 CROSS SECTION RELATIVE TO A-LINE WITH STATION LOCATION

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ALTERNATIVE 6 SITE PLAN

JOB NO. 140540	APRIL 2015	FIGURE 2

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NOTES

1. BASEMAP TAKEN FROM PLANS TITLED, "ALMADEN LAKE IMPROVEMENT PROJECT," PREPARED BY SANTA CLARA VALLEY WATER DISTRICT, PROJECT NO. 26044001.

WINFIELD BOULEVARD

COLEMAN ROAD

ALMADEN EXPRESSWAY

ALMADEN LAKE

NEW ISLAND

NEW ISLAND

NEW LEVEE

NEW LEVEE

ALAMITOS CREEK

A1–LINE, LOW FLOW CHANNEL

LB–1

WB–1

LB–2

WB–3

WB–2

LB–3

LB–4

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 17+89

SCALE 80 0 80 160 FEET

LEGEND

LB–4 BORING LOCATION (LAND)

WB–3 BORING LOCATION (WATER)

16+50 CROSS SECTION RELATIVE TO A–LINE WITH STATION LOCATION

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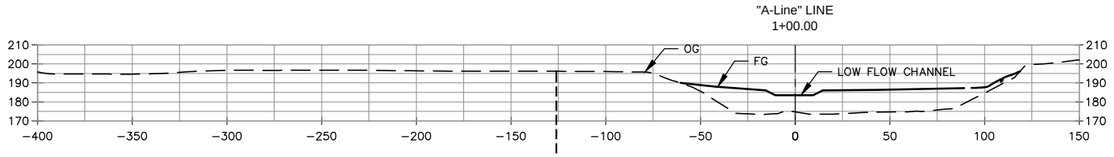
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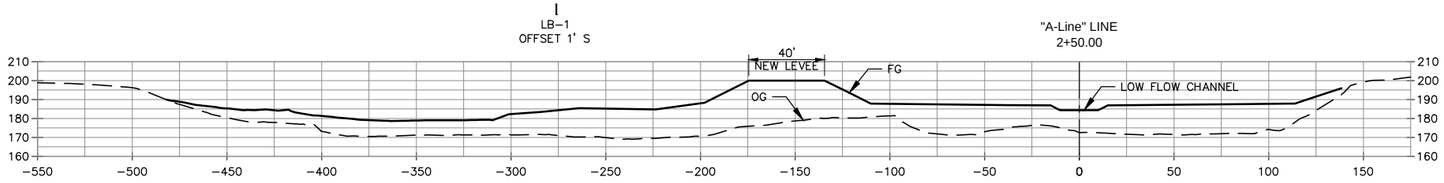
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SAN JOSE, CALIFORNIA

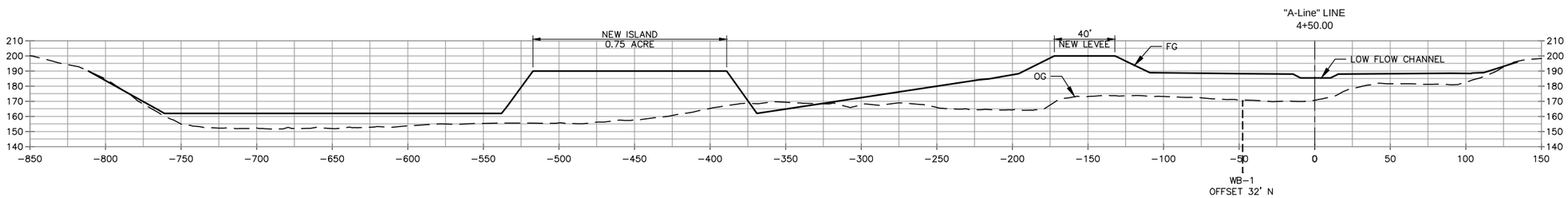
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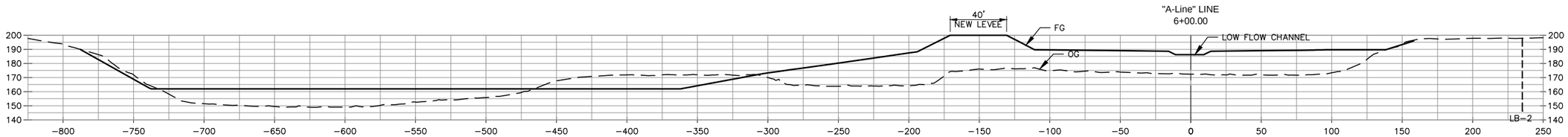
JOB NO. 140540	APRIL 2015	FIGURE 3

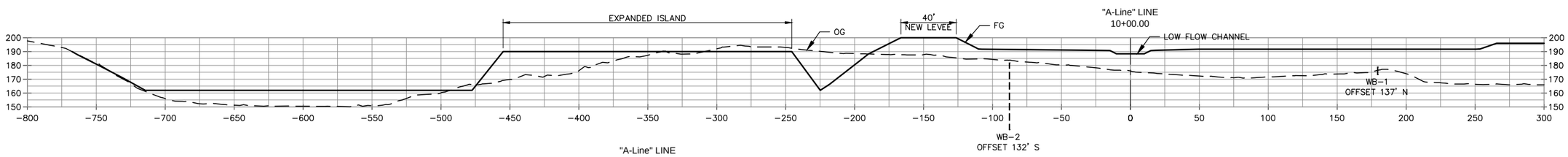
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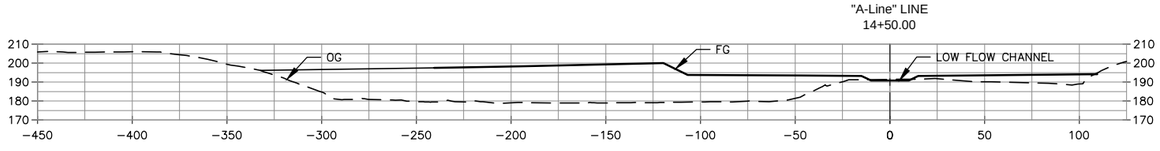


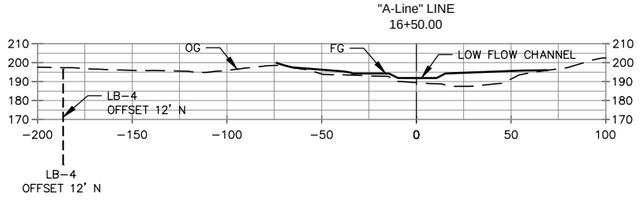












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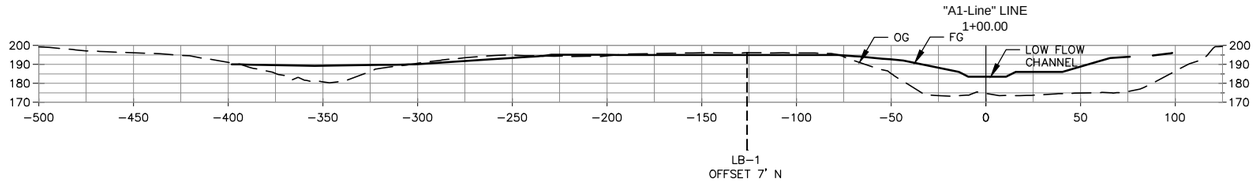
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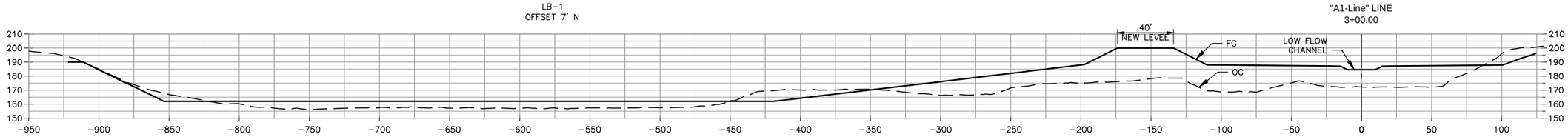
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ALMADEN LAKE IMPROVEMENT PROJECT
SAN JOSE, CALIFORNIA

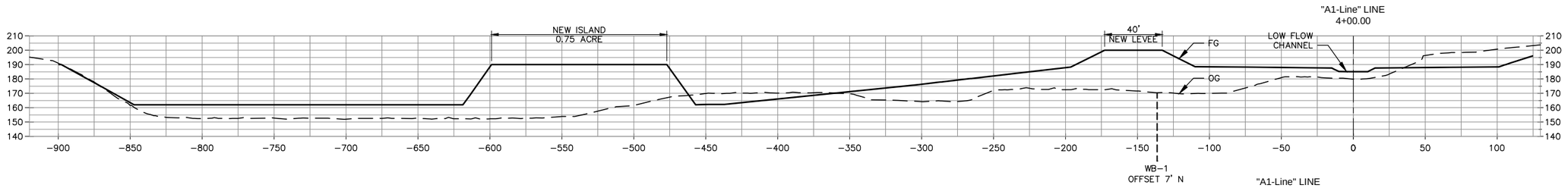
ALTERNATIVE 6 SECTIONS

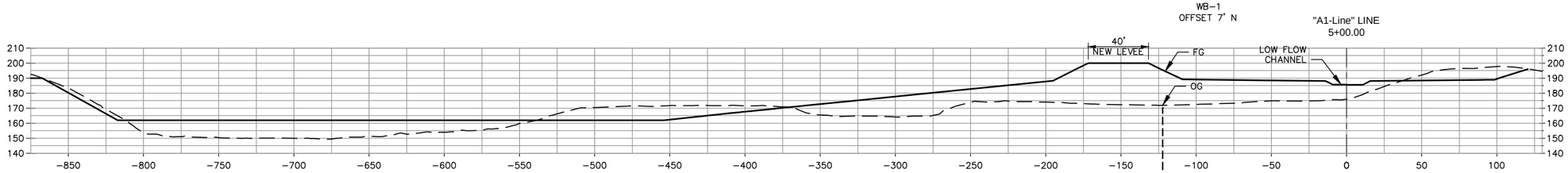
JOB NO. 140540	APRIL 2015	FIGURE 4

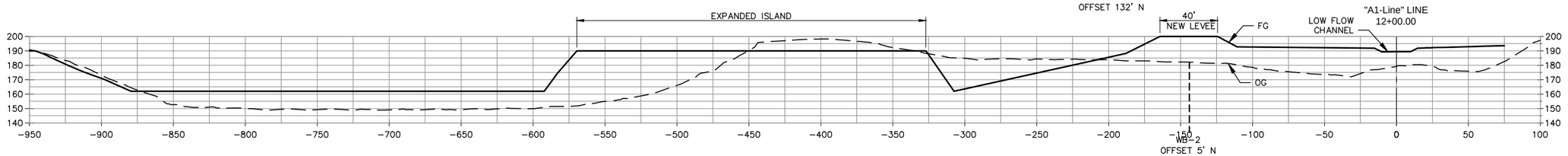
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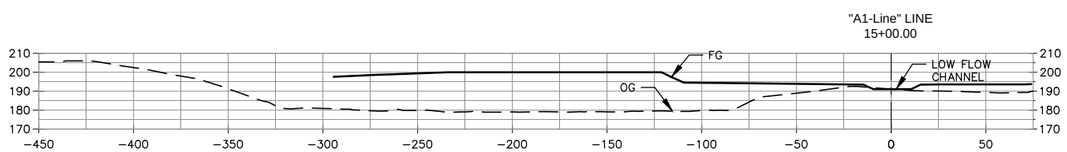


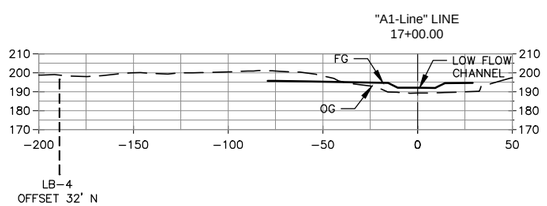














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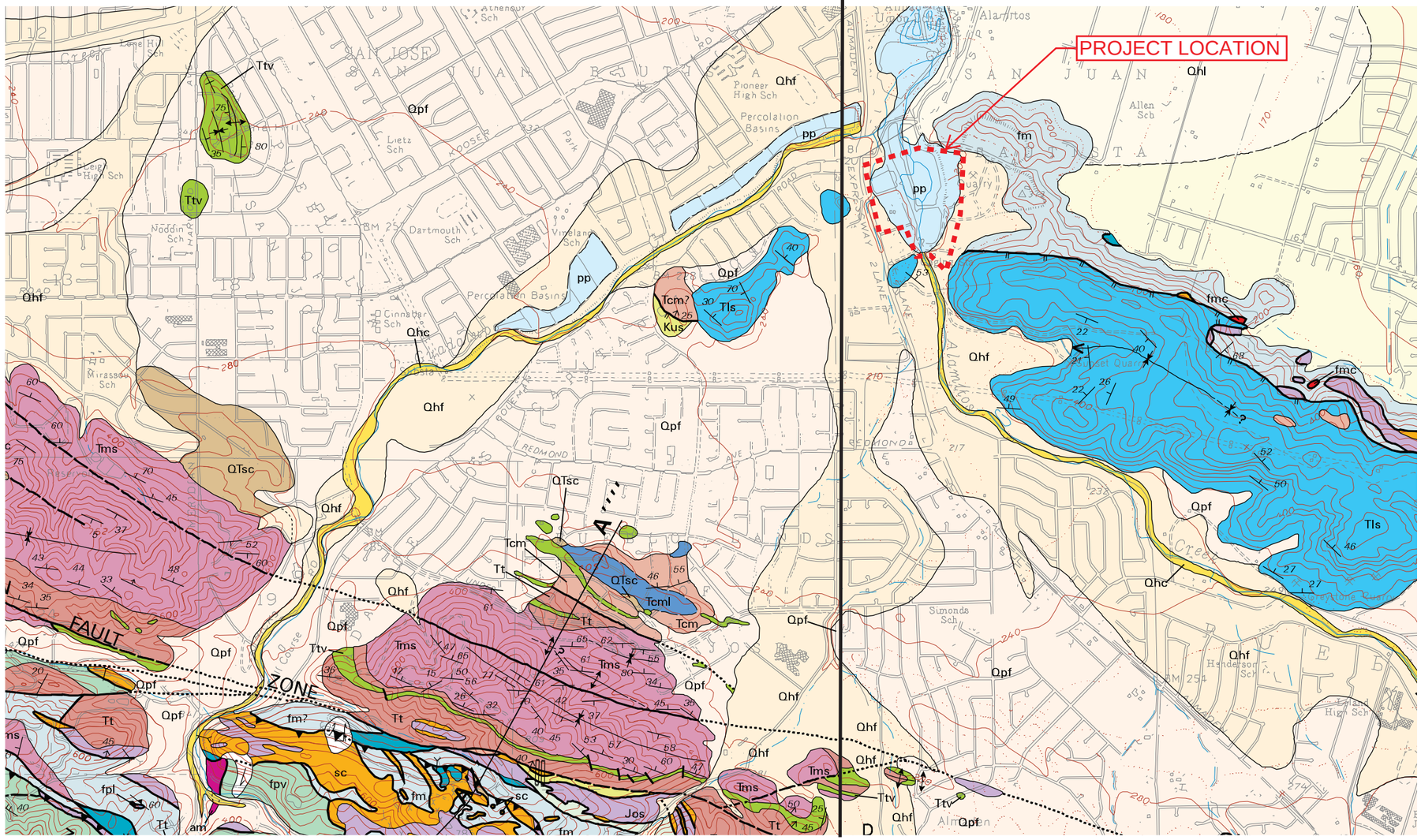
ALTERNATIVE 7 SECTIONS

JOB NO. 140540	APRIL 2015	FIGURE 5

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LOS GATOS QUADRANGLE

SANTA TERESA HILLS QUADRANGLE



SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2

1000 500 0 METERS 1000 2000

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MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

FEET

REFERENCE: "GEOLOGIC MAPS AND STRUCTURE SECTIONS OF THE SOUTHWESTERN SANTA CLARA VALLEY AND SOUTHERN SANTA CRUZ MOUNTAINS, SANTA CLARA AND SANTA CRUZ COUNTIES, CALIFORNIA," BY MCLAUGHLIN AND OTHERS, 2001, USGS MISCELLANEOUS FIELD STUDIES MAP MF-2373

LEGEND

pp Gravel pit (Holocene)
Qhf Alluvial fan deposits (Holocene)
Qhl Levee deposits (Holocene)
Qhc Stream channel deposits (Holocene)
Qpf Alluvial fan deposits (Pleistocene)
sc Silica-carbonate rock (Miocene?)
Jos Serpentinized ultramafic rocks (Jurassic?)
fm Melange of the Central belt (Upper Cretaceous)
fmc Radiolarian chert (Lower Cretaceous and Jurassic)
Tls Sandstone and mudstone (Eocene)
Tcm Mottled mudstone and sandstone of Mount Chual (Lower Eocene)
Kus Sandstone and shale (Upper Cretaceous)

Note:
Units summary descriptions above are located within approximately 1 mile of the project location. Full descriptions of Units shown are located in USGS MF-2373.

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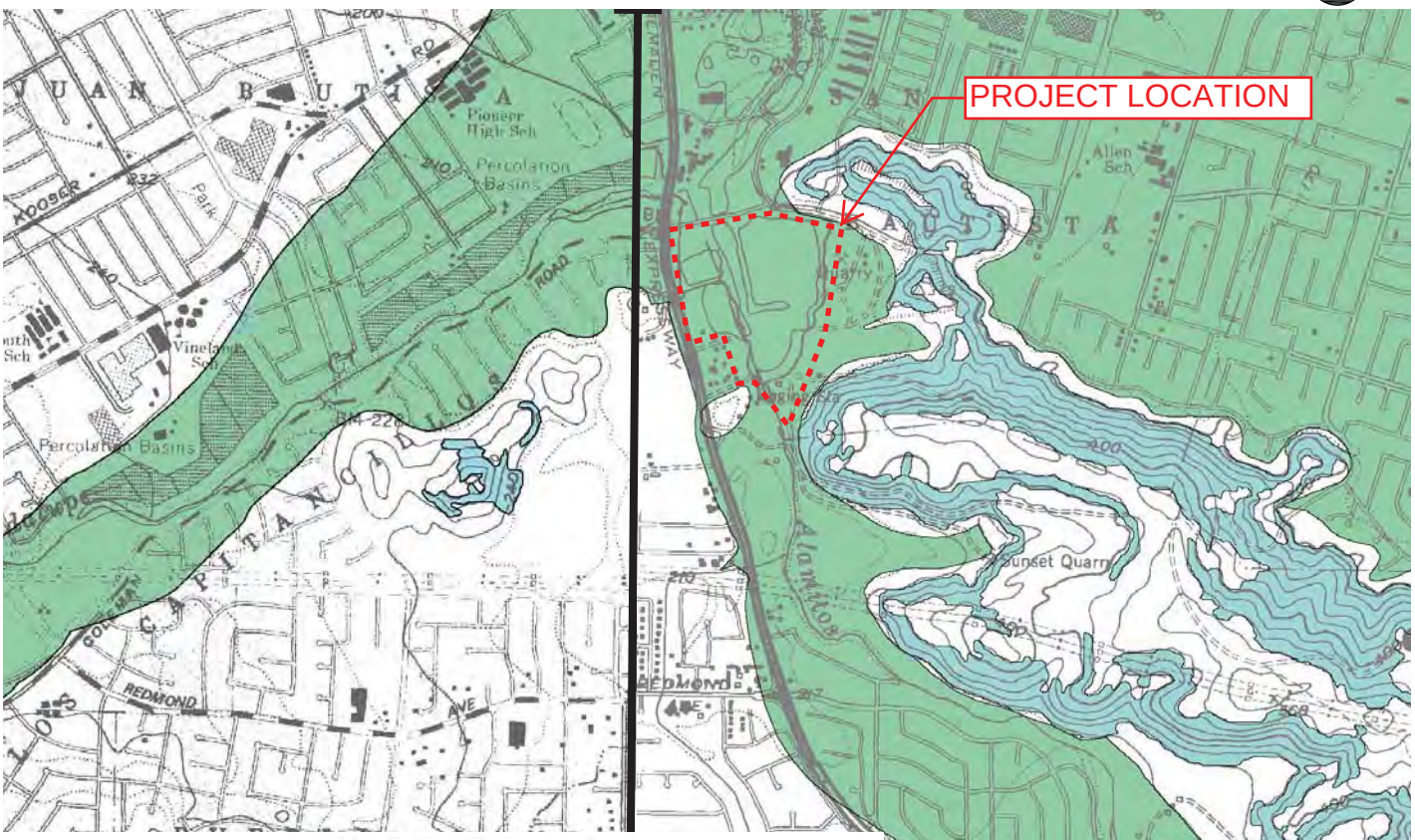
REGIONAL GEOLOGY MAP

JOB NO. 140540	APRIL 2015	FIGURE 6

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LOS GATOS QUADRANGLE

SANTA TERESA HILLS QUADRANGLE



MAP EXPLANATION

Zones of Required Investigation:

Liquefaction

Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground-water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslides

Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

NOTE: Seismic Hazard Zones identified on this map may include developed land where delineated hazards have already been mitigated to city or county standards. Check with your local building/planning department for information regarding the location of such mitigated areas.

SCALE 1:24,000

1 .5 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

SOURCE - SEISMIC HAZARD ZONES MAP
LOS GATOS QUADRAGLE - 2002

SOURCE - SEISMIC HAZARD ZONES MAP
SANTA TERESA HILLS QUADRANGLE - 2003

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SEISMIC HAZARD ZONE MAP

JOB NO. 140540	APRIL 2015	FIGURE 7



Map Scale: 1:4,640 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

Map Unit Symbol	Map Unit Name
131	Urban land-Elpaloalto complex, 0 to 2 percent slopes
160	Urbanland-Clear Lake complex, 0 to 2 percent slopes
165	Urbanland-Campbell complex, 0 to 2 percent slopes, protected
170	Urbanland-Landelspark complex, 0 to 2 percent slopes
190	Cumulic Haploxerolls, 1 to 5 percent slopes
306	Alo-Altamont complex, 30 to 50 percent slopes
375	Alumrock-Zepplin complex, 15 to 30 percent slopes
378	Urbanland-Alumrock-Zeppelin complex, 9 to 15 percent slopes
W	Water

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Clara Area, California, Western Part
Survey Area Data: Version 3, Sep 18, 2014

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SANTA CLARA VALLEY WATER DISTRICT
ALMADEN LAKE IMPROVEMENT PROJECT
SAN JOSE, CALIFORNIA

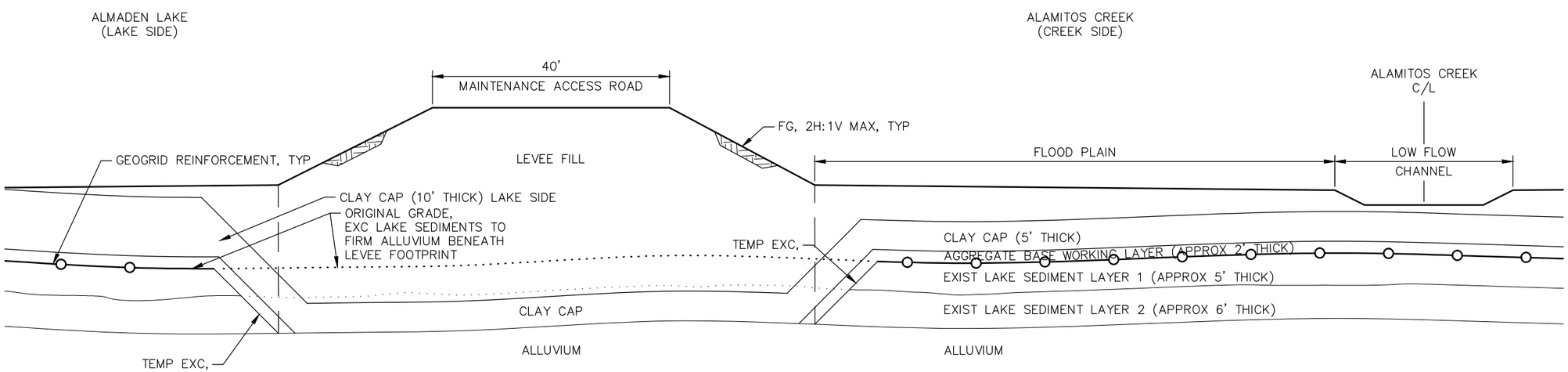
NRCS SURFICIAL SOIL MAP

JOB NO. 140540	APRIL 2015	FIGURE 8

M:\2014\140540 SCVWD Almaden Lake Improvements\AutoCAD Files\Plan\BorderFigure 11x17.dwg 4-30-15 09:36:35 AM ezone

NOTES

1. THIS SECTION IS INTENDED TO SHOW THE TYPICAL WIDTH AND DEPTH OF THE LEVEE AND RECOMMENDED SUBEXCAVATION OF SOFT LAKE SEDIMENTS.
2. THE LAYER THICKNESSES SHOWN ARE SCHEMATIC AND VARY ACROSS THE SITE.
3. THE MINIMUM WIDTH OF THE SUBEXCAVATION SHOULD EXTEND FROM THE LEVEE TOE ON THE LAKE SIDE TO THE LEVEE TOE ON THE CREEK SIDE. STABILITY OF THE TEMPORARY CONSTRUCTION SLOPES ARE THE RESPONSIBILITY OF THE CONTRACTOR.



TYPICAL LEVEE SECTION

10 0 10 20
SCALE FEET

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SANTA CLARA VALLEY WATER DISTRICT
ALMADEN LAKE IMPROVEMENT PROJECT
SAN JOSE, CALIFORNIA

TYPICAL LEVEE SECTION

JOB NO. 140540	APRIL 2015	FIGURE 9

M:\2014\140540 SCVWD Almaden Lake Improvements\AutoCAD Files\Figures\Figure 9.2015.01.15.dwg 4-30-15 08:18:03 AM ezone

APPENDIX A

Boring Logs

Analytical Test Results of Drill Cuttings and Drilling Fluid

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KEY TO SYMBOLS

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)


ASPHALT: Asphalt


CH: USCS High Plasticity Clay


CL: USCS Low Plasticity Clay


GM: USCS Silty Gravel


GP: USCS Poorly-graded Gravel


GW: USCS Well-graded Gravel


GW-GC: USCS Well-graded Gravel with Clay


GW-GM: USCS Well-graded Gravel with Silt


MH: USCS Elastic Silt


ML: USCS Silt


OH: USCS High Plasticity Organic silt or clay


SC: USCS Clayey Sand


SM: USCS Silty Sand


SP: USCS Poorly-graded Sand


SW: USCS Well-graded Sand


SW-SC: USCS Well-graded Sand with Clay

SAMPLER SYMBOLS


California Modified Sampler


Shelby Tube


Standard Penetration Test

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION


Water Level at Time Drilling, or as Shown


Water Level at End of Drilling, or as Shown


Water Level After 24 Hours, or as Shown

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BORING NUMBER LB-1

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 9/8/2014 **COMPLETED** 9/8/2014
GROUND ELEVATION 197 ft **DATUM** WGS84 **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: **LATITUDE** 37.2427 **LONGITUDE** -121.87241
DRILLING RIG/METHOD CME-55/6-in. Hollowstem Auger
GROUNDWATER AT TIME OF DRILLING 18.5 ft / Elev 178.5 ft
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		SILT with SAND (ML), brown, dry (ARTIFICIAL FILL)									
		CLAYEY SAND (SC), brown and light brown, moist, dense, angular to rounded gravel up to 1/2 in., very fine to fine sand	CM	15-31-45			9	35	19	16	46
5		WELL GRADED GRAVEL with SILT and SAND (GW-GM), brown, dry to moist, very dense, gravel greater than 2.5 in., very fine to medium sand	CM	37-50							
		CLAYEY SAND (SC), brown, dry to moist, dense, gravel greater than 2.5 in., very fine to medium sand	SPT	17-13-40							
		Grades to WELL GRADED GRAVEL with SILT and SAND (GW-GM)									
10		CLAYEY SAND with GRAVEL (SC), brown grades to gray, moist, medium dense, rounded gravel up to 1/2 in., very fine to coarse sand	CM	6-7-14		120	8				16
		Asphalt with rounded gravel up to 1 in. at the bottom of the sample.									
		WELL GRADED SAND with GRAVEL and CLAY (GW-GC) and Old Asphalt, very dark brown to black, moist, dense to very dense, rounded gravel up to 1/2 in., very fine to very coarse sand									
15		Assumed contact at 18 ft based on driller's indication.	CM	14-42-22		124	5				
		▽ POORLY GRADED SAND (SP) to WELL GRADED SAND with GRAVEL (SW) (ALLUVIUM)									
20		WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown to gray brown, wet, medium dense, fine to very coarse sand, rounded to subrounded gravel up to 3/4 in.	CM	7-14-16		128	11				7
25		WELL GRADED GRAVEL with SAND and SILT (GW-GM), gray with red brown mottling, wet, dense to very dense, fine to very coarse sand, some clay, rounded to subangular gravel up to 1/2 in.	CM	16-41-32		131	9				
30		WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown, wet, medium dense, fine to very coarse sand, rounded to subangular gravel up to 3/4 in.	CM	22-17-18							
		WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, wet, medium dense, fine to very coarse sand, rounded to subangular gravel up to 3/4 in.									
35											

(Continued Next Page)

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BORING NUMBER LB-1

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		WELL GRADED GRAVEL with SAND and SILT (GW-GM) grades to WELL GRADED GRAVEL with SAND (GW), brown, wet, medium dense, angular to subrounded gravel up to 1 in., very fine to very coarse sand	CM	15-14-15		118	14				10
40		WELL GRADED GRAVEL with SAND and SILT (GW-GM), wet, dense, fine to very coarse sand, angular to subrounded gravel up to 2 in.	CM	34-31-28							
45		WELL GRADED SAND with GRAVEL and SILT (SW-SM), gray brown, wet, dense, fine to very coarse sand, angular to subangular gravel up to 1/2 in.	CM	15-13-29							
50		WELL GRADED GRAVEL with SAND (GW) to WELL GRADED GRAVEL with SILT (GW-GM), brown, wet, medium dense, subrounded to angular gravel up to 2 in., fine to coarse sand	CM	7-13-15							

Bottom of borehole at 51.5 ft. Borehole backfilled with grout.

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BORING NUMBER LB-2

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 9/9/2014 **COMPLETED** 9/9/2014
GROUND ELEVATION 197 ft **DATUM** WGS84 **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: **LATITUDE** 37.24133 **LONGITUDE** -121.87305
DRILLING RIG/METHOD CME-55/6-in. Hollowstem Auger
GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING 15.0 ft / Elev 182.0 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		SANDY SILT (ARTIFICIAL FILL)									
		GRAVELLY LEAN CLAY (CL), brown, moist, hard, angular gravel up to 3/4 in., very fine to medium sand	CM	20-20-19		102	9				
		WELL GRADED GRAVEL with SAND and SILT (GW-GC), brown, moist, medium dense, angular gravel up to 75 in., very fine to medium sand									
5		SANDY SILT with GRAVEL (ML), brown, dry, hard	CM	27-30-25			3				12
		WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown, dry, dense, angular gravel up to 3/4 in., very fine to medium sand									
		ELASTIC SILT (MH), very dark gray, wet, soft									
10		Old asphalt and base rock gravel and concrete. Concrete fragments in cuttings.	CM SPT	3-50/3" 50/4"							
15		SILTY GRAVEL with SAND and ASPHALT (GM), dark gray, wet, medium dense, very fine to coarse sand, angular gravel up to .75 in.	CM	2-12-18		122	11				19
20		WELL GRADED SAND with GRAVEL and SILT (SW-SM), gray, wet, medium dense, fine to very coarse sand, subangular to rounded gravel up to 2 in. (ALLUVIUM) Wood fragments in cuttings at 23'.	CM	12-23-21		131	9				9
		WELL GRADED GRAVEL with SAND and SILT (GW-GM), gray with brown lenses, wet, dense, angular to subrounded gravel up to 1 ft., fine to coarse sand									
25			CM	19-25-24							8
		WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown, wet, dense, fine to coarse sand, angular to subangular gravel up to 1 in.									
30			CM	23-33-25			14				8
35											

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BORING NUMBER LB-2

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown to gray brown, wet, dense, fine to very coarse sand, angular to subrounded gravel up to 1/2 in. with isolated cobbles larger than 2.5 in. at the bottom of the sample. Lenses of well graded sand with gravel and silt	CM	13-30-34							
40		WELL GRADED GRAVEL with SAND (GW) to WELL GRADED SAND and SILT (GW-GM), brown gray, wet, very dense, gravel larger than 1.25 in. at the bottom	CM	30-44-50/5"							
45		WELL GRADED GRAVEL with SAND and SILT (GW-GM)	CM	13-24-25							
50		WELL GRADED GRAVEL with SAND and SILT (GW-GM), gray to brown, wet, dense, angular to subangular gravel up to 1in., fine to very coarse sand	SPT	12-17-17			11				

Bottom of borehole at 51.5 ft. Borehole backfilled with grout.

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BORING NUMBER LB-3

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 9/9/2014 **COMPLETED** 9/9/2014
GROUND ELEVATION 202 ft **DATUM** WGS84 **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: **LATITUDE** 37.23942 **LONGITUDE** -121.87238
DRILLING RIG/METHOD CME-55/6-in. Hollowstem Auger
GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING 14.0 ft / Elev 188.0 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		4 in. mulch underlain by silt with sand (ML) (ARTIFICIAL FILL)									
		SANDY SILT (ML), brown, dry, hard, few angular gravel, very fine to medium sand	CM	28-34-46							
5		WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, dry, dense, angular to subangular gravel up to 1/2 in. in SPT sampler	CM	35-44-34							
10		WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, dry, very dense, angular to subrounded gravel up to 1 in., very fine to coarse sand, trace iron stains	CM	25-47-48			3				10
15		WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, wet, dense, angular sand, medium to very coarse, rounded to subangular gravel up to 1", chert and graywacke, rock fragments, isolated cobble at the bottom of sample greater than 2.5 in. (ALLUVIUM)	CM	18-29-19		124	10				9
20		WELL GRADED GRAVEL with SAND and CLAY (GW-GC), brown grades to brown gray, wet, dense, angular gravel up to 3/4 in., fine to very coarse sand	CM	15-24-35							
25		WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown to gray brown, wet, medium dense, angular to subangular gravel, fine to very coarse sand	CM	11-15-10		115	12				5
30		WELL GRADED GRAVEL with SAND and SILT (GW-GM) to WELL GRADED GRAVEL with SILT (GW-GM), brown to gray brown, wet, medium dense	CM	12-19-23		132	13				9
35											

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BORING NUMBER LB-3

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		WELL GRADED SAND with GRAVEL and SILT (SW-SM) to WELL GRADED SAND with GRAVEL (SW), gray brown, wet, medium dense, medium to very coarse sand, subangular to subrounded gravel up to 1/2 in.	CM	23-28-20							
		SANDY SILT (ML), gray brown, wet, firm, low to non plastic, very fine to fine sand									
40			CM	5-13-20		114	17				27
		WELL GRADED SAND with GRAVEL and SILT (SW-SM), gray brown, wet, medium dense, angular to subrounded gravel up to 3/8 in., very fine to medium sand									
		SILTY SAND (SM), gray brown, wet, loose, fine to medium sand, trace iron stains									
45			CM	4-7-6		89	34				26
		Pushed rock while driving to recover gravel larger than 1.25 in. and SANDY CLAY with GRAVEL (CL) to WELL GRADED SAND with GRAVEL and CLAY (SW-SM), brown, wet, dense									
50			SPT	14-18-24			3				

Bottom of borehole at 51.5 ft. Borehole backfilled with grout.

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BORING NUMBER LB-4

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 9/8/2014 **COMPLETED** 9/8/2014
GROUND ELEVATION 195 ft **DATUM** WGS84 **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: **LATITUDE** 37.23862 **LONGITUDE** -121.87067
DRILLING RIG/METHOD CME-55/6-in. Hollowstem Auger
▽ **GROUNDWATER AT TIME OF DRILLING** 9.0 ft / Elev 186.0 ft
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		SILT with SAND and GRAVEL (ML), brown, dry (ARTIFICIAL FILL)									
		WELL GRADED GRAVEL with SAND and CLAY (GW-GC) to GRAVELLY LEAN CLAY with SAND (CL), brown to light brown and gray, dry to moist, very dense to very hard, angular to subangular gravel up to 1 in.	CM	15-40-40			4				
5		WELL GRADED GRAVEL with SAND (GW), brown, dry to moist, very dense, angular to rounded gravel up to 1 in..	CM	25-50			5				
		WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, moist, dense	SPT	27-22-16							
		▽ Driller indicated large cobbles while drilling.									
10		WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, wet, medium dense, medium to very coarse sand, angular to subrounded gravel up to 1/2 in. (ALLUVIUM)	SPT	14-11-9			11				11
		POORLY GRADED SAND (SP), olive gray brown, wet, loose, very fine to medium sand									
15			CM	0-5-27		93	33				39
		CLAYEY SAND (SC), brown, wet, dense, angular gravel up to 3/4 in.									
20		WELL GRADED GRAVEL with SAND and CLAY (GW-GC), gray brown to brown, wet, dense, angular gravel up to 1/2 in. with gravel greater than 2.5 in. at the bottom of the sample, very fine to very coarse sand	CM	12-23-29		122	14				
25		WELL GRADED GRAVEL with SAND and CLAY (GW-GC) to CLAYEY GRAVEL in lenses (GW-GC), moist to wet, dense, rounded to subangular gravel up to 1 in., fine to coarse sand	CM	17-16-37		130	12				
		SANDY LEAN CLAY (CL), brown, moist, firm grades to hard									
30			CM	6-8-10		107	20	36	17	19	64
		SILT with SAND (ML)									
		POORLY GRADED SAND (SP), brown gray, wet, loose, very fine to medium sand									
35											

(Continued Next Page)

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BORING NUMBER LB-4

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		WELL GRADED SAND with SILT (SW-SM), brown gray, wet, medium dense, fine to very coarse sand, angular to subangular gravel up to 1/2 in.	CM	3-5-20		116	18				5
40		WELL GRADED SAND (SW), brown gray, wet, dense									
		WELL GRADED GRAVEL (GW), angular gravel larger than 2.5 in. at 41 ft	CM	25-39-45			11				
		WELL GRADED SAND with GRAVEL and CLAY (GW-GC) to CLAYEY SAND with GRAVEL (SC), brown gray, wet, very dense, very fine to very coarse sand, angular to subangular gravel up to 3/4 in.									
45		WELL GRADED SAND with GRAVEL (SW), brown gray, wet, medium dense									
		SANDY FAT CLAY (CH), gray brown, moist, hard, trace gravel	CM	7-13-17				55	19	36	65
		SILTY SAND (SM) grades to WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown, gray, wet, very dense, very fine to coarse sand									
50			SPT	50/3"							

Bottom of borehole at 50.3 ft. Borehole backfilled with grout.

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BORING NUMBER WB-1

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 10/8/2014 **COMPLETED** 10/8/2014
GROUND ELEVATION 173 ft **DATUM** WGS84 **HOLE SIZE** 5 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: **LATITUDE** 37.24181 **LONGITUDE** -121.87205
DRILLING RIG/METHOD CME-45/Rotary Wash
GROUNDWATER AT TIME OF DRILLING --- 18 ft above Sediment
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0	SILT (ML) to ELASTIC SILT (MH) with ORGANICS (OH), black, wet, very soft, few sand, Pocket Torvane= 0.016 tsf at 2 ft (LAKE SEDIMENT)	SH		0.1						
	Interbedded layers of SANDY SILT (ML), PEAT (PT), and FAT CLAY (CH), black to dark gray, wet, very soft	CM	0-0-1		32	145				
5	LEAN CLAY with SAND (CL), dark gray, wet, very soft, very fine to fine sand, Pocket Torvane= 0.05 tsf at 7 ft	SH			55	72	45	26	19	82
		CM	15-20-20	0.1	122	11				10
10	WELL GRADED GRAVEL with SAND and SILT (GW-GM), light gray olive brown, wet, medium dense (ALLUVIUM)	SPT	17-17-15							
	WELL GRADED GRAVEL with SAND and SILT (GW-GM), gray brown, wet, dense, fine to coarse sand, angular to subangular gravel up to 1/2 in.									
	WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown gray, wet, dense, subrounded to subangular gravel up to 3/4 in., very fine to very coarse sand	SPT	17-13-24			9				11
15	Driller indicated isolated large gravel/cobbles and increased drilling resistance.									
	WELL GRADED GRAVEL with SAND and SILT (GW-GM), gray brown to brown gray, wet, very dense, fine to very coarse sand, angular to subangular gravel up to 3/4 in.	SPT	22-24-26			10				9
20	SILTY SAND (SM), brown gray, wet, dense, fine to coarse sand, angular to subangular gravel up to 1/2 in	SPT	24-25-17			10				13
25	Increased gravel content in cuttings at 24 ft.									
	WELL GRADED GRAVEL with SAND and SILT (GW-GM) with lenses of WELL GRADED SAND with GRAVEL and SILT (SW-SM), gray brown, wet, very dense, angular to subangular gravel up to 1 in., fine to very coarse sand	SPT	14-27-32			11				7
30	Increased gravel content in cuttings, subrounded gravel up to 3/4 in.									
	WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown gray, wet, dense, gravel grater than 1.5 in. at bottom of sampler resulting in limited recovery of sample	SPT	20-26-20							
35										

(Continued Next Page)

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BORING NUMBER WB-1

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		SILTY SAND with GRAVEL (SM), olive gray, wet, medium dense	SPT	6-5-12			27	29	26	3	21
		WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown gray, wet, medium dense, angular to subangular gravel up to 1 in., fine to very coarse sand									
40		WELL GRADED GRAVEL with SAND and CLAY (GW-GC), brown gray, wet, very dense, angular gravel up to 1 in., fine to very coarse sand, iron stains	SPT	34-39-35							
		Decreased coarse gravel in cuttings at 44 ft									
45		WELL GRADED GRAVEL with SAND and CLAY (GW-GC), brown gray, wet, dense, subrounded to subangular gravel up to 1 in., fine to coarse sand	SPT	21-25-21							

Bottom of borehole at 47.5 ft. Borehole backfilled with grout.

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BORING NUMBER WB-2

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 10/7/2014 **COMPLETED** 10/7/2014
GROUND ELEVATION 184 ft **DATUM** WGS84 **HOLE SIZE** 5 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: **LATITUDE** 37.23993 **LONGITUDE** -121.87165
DRILLING RIG/METHOD CME-45/Rotary Wash
GROUNDWATER AT TIME OF DRILLING --- 7 ft above Sediment
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0	ORGANIC RICH SILT (OH/MH), black, wet, very soft, trace sand, some clay, medium to high plasticity (LAKE SEDIMENT)	SH		0.1	53	75				
	INTERBEDDED LAYERS OF FAT CLAY (CH), ELASTIC SILT (MH), and SAND (SW), blue gray, wet, very soft to very loose, very fine to coarse sand	CM	0-1-1							
5	ORGANIC SILTY SAND (SM), dark gray, wet, very loose, very fine to medium sand, fat clay and silt lenses	SH		0.2	55	69	37	27	10	42
10	ELASTIC SILT (MH), gray, wet, very soft, few sand, trace organics	CM	0-1-2							
	Driller indicated harder drilling resistance at 11 ft with a color change to brown very coarse gravel in cuttings WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown with blue gray mottling, wet, medium dense, very fine to coarse sand, angular to subangular gravel up to 1/2 in (ALLUVIUM)	SPT	6-10-9			13				14
15	WELL GRADED SAND with GRAVEL and SILT (SW-SM)	SPT	13-6-15			14				22
	ELASTIC SILT (MH), brown gray, to gray brown, wet, soft WELL GRADED SAND with GRAVEL and SILT (SW-SM), gray brown, wet, medium dense, angular gravel up to 1/2 in. with gravel grater than 1.5 in at 18.5 ft									
20	WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown to gray brown, wet, very dense, angular gravel greater than 1.5 in., very fine to coarse sand	SPT	9-26-40			7				6
25	No recovery with SPT sampler, used CM sampler to recover. Subangular to subrounded gravel larger than 2.5 in. at bottom of CM sampler.	SPT	10-6-4							
	SILT (ML) to SILTY SAND (SM) based on limited recovery and observed cuttings.									
30	Driller indicated very easy drilling resistance between 28.5 ft and 31 ft and very dense and increased resistance at 31 ft. WELL GRADED GRAVEL (GW), gray, wet, very dense, angular gravel larger than 1.5 in.	SPT	27-29-16			11				
	WELL GRADED SAND with GRAVEL and SILT (SW-SM), gray brown, wet, dense, fine to very coarse sand									
35										

(Continued Next Page)

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BORING NUMBER WB-2

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		Coarse sand and fine gravel observed in cuttings. Driller indicated increased drilling resistance between 35 and 37 ft. Driller indicated large gravel or cobble.	SPT	50/3"							
40		Driller indicated very hard drilling resistance.									
		Driller indicated decrease in drilling resistance at 40.5 ft.									
		WELL GRADED SAND with GRAVEL and CLAY (SW-SC), gray to brown gray with red nodules, wet, dense, very fine to coarse sand, angular to subangular gravel up to 1/2 in.	SPT	30-24-22							9
45		WELL GRADED SAND with GRAVEL and CLAY (SW-SC), brown gray, wet, dense, fine to very coarse sand	SPT	24-17-17							10

Bottom of borehole at 48.5 ft. Borehole backfilled with grout.

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BORING NUMBER WB-3

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 10/9/2014 **COMPLETED** 10/9/2014
GROUND ELEVATION 180 ft **DATUM** WGS84 **HOLE SIZE** 5 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: **LATITUDE** 37.24045 **LONGITUDE** -121.87278
DRILLING RIG/METHOD CME-45/Rotary Wash
GROUNDWATER AT TIME OF DRILLING --- 11 ft above Sediment
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		SILT (ML) to ELASTIC SILT (MH), black, wet, very soft (LAKE SEDIMENT)									
5		WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, wet, dense, angular gravel up to 1 in. (ALLUVIUM)	SPT	10-14-24			8				11

Bottom of borehole at 5.5 ft. Borehole backfilled with grout.

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

APPLICATION TO DRILL EXPLORATORY BORINGS

FC 285 (04-16-13)
Page 1 of 2

Date Issued:	Expiration Date:	District Permit No.:
Client (if different from property owner): Santa Clara Valley Water District	**Property Owner:**	Name of Business/Residence at Site: Lake Almaden
Client's Address: 5750 Almaden Expressway City, State, Zip: San Jose, CA 95118	Property Owner's Address: City, State, Zip	Address of Site: Almaden Rd City, State, Zip: San Jose, CA
Telephone No.: 408-265-2600	Telephone No.:	Assessor's Parcel No. of Site: 6940/038 Book ___ Page ___ Parcel ___

Consulting Company Name: Cal Engineering & Geology	Drilling Company Name: Taber Drilling	
Address: 1870 Olympic Blvd #100 City, State, Zip: Walnut Creek, CA 94596	Address: 536 Galveston Street City, State, Zip: West Sacramento, CA 95691	
Telephone No.: 925-935-9771	Telephone No.: 916-371-8234	C-57/C-61 License No.: 969927
☐ Check if address or phone number has changed	☐ Check if address or phone number has changed	

In space at right, sketch location of proposed boring(s) in sufficient detail to identify location. In addition to distances to nearest street and intersection, show distances to any existing structures, landmarks, or topographic features.

How many borings will be installed on parcel? 2

☒ Proposed borings on District property/easement (See General Condition F, page 2.)

☒ Within 50 feet of the top of a creek bank or District facility

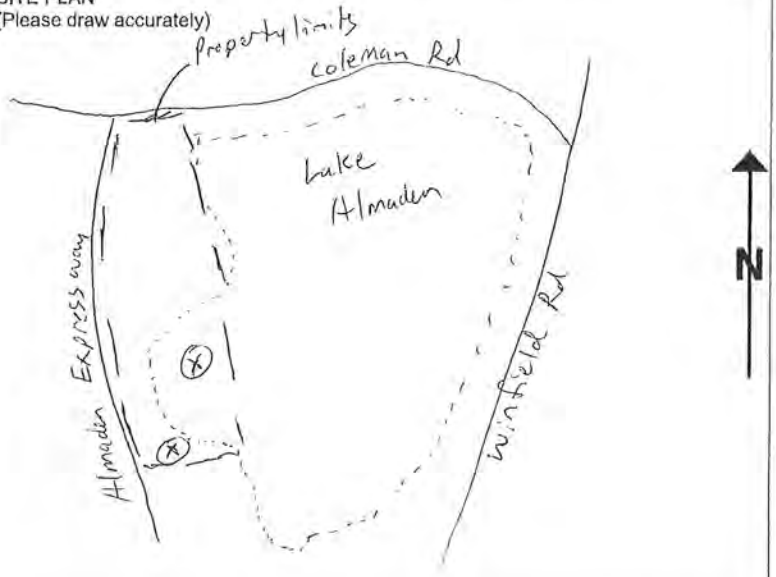
Proposed depth of boring(s):

☒ 45 to 150 feet
☐ 151 to 300 feet
☐ Over 300 feet

NOTE: No permit is required for borings under 45 feet deep.

Boring Type:	Boring Use:
☒ Hollow stem	☒ Geotechnical Investigation
☒ Rotary	☐ Environmental Investigation
☐ CPT	☐ Material Emplacement
☐ Hydropunch	☐ Sensor Emplacement
☐ Other: ___	☐ Other: ___

SITE PLAN
(Please draw accurately)



SIGNATURES

I understand and agree that all work associated with this permit is required to be done in accordance with Santa Clara Valley Water District (District) Well Ordinance 90-1, the District Well Standards, and conditions of this permit (see page 2). I certify that the information given in this permit is correct to the best of my knowledge and that the signature below, whether original, electronic, or photocopied, is authorized and valid, and is affixed with the intent to be enforceable. I also certify that a right of entry/encroachment agreement has been formalized between the well owner and property owner, if parties differ.

Signature of Property Owner/Agent:	Print/Type Name:	Date:
Signature of Client/Agent:	Print/Type Name:	Date:
Signature of Driller/Agent:	Print/Type Name: Brian Young	Date: 8.4.14
Signature of Consultant/Agent:	Print/Type Name: David Burger	Date: 8-4-14

IMPORTANT: A minimum 24-hour notice must be given to Santa Clara Valley Water District Well Inspection Department prior to installing the annular seal. Call (408) 265-2607, ext. 2660. Please allow 10 working days to process permit application.

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

APPLICATION TO DRILL EXPLORATORY BORINGS

GENERAL CONDITIONS

A. **District** (telephone 408-630-2660) **must be notified a minimum of one working day before the exploratory boring is backfilled.** An authorized District representative must be on site to witness the sealing operation. This requirement may be waived by an authorized District representative. If the District waives the inspection requirement, the District may request the permittee(s) to furnish certification under penalty of perjury that the seal was constructed in accordance with the District Well Standards.

B. This permit is valid only for the purpose specified herein. Boring destruction methods authorized under this permit may not be changed except by written approval of an authorized District representative, and only if the District believes that such a change will result in equal or superior compliance with the District and State Well Standards (e.g., if the District representative finds that site conditions warrant such a change).

C. This permit is only valid for the Assessor's Parcel No. indicated on it.

D. This permit may be voided if it contains incorrect information.

E. Borings shall be sealed within 24 hours following completion of testing or sampling activities. Borings shall not be left in such a condition as to allow for the introduction of surface waters or foreign materials into them. Borings shall be secured such that they do not endanger public health.

F. If any work associated with this permit will take place on District property/easement, an encroachment or construction permit must be granted by the District's Community Projects Review Unit (telephone 408-630-2350, -2217, or -2253).

G. The permittee(s) shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend, and hold the District, its officers, agents, and employees, free and harmless from any and all expense, cost, and liability in connection with or resulting from the granting or exercise of this permit including, but not limited to, property damage, personal injury, and wrongful death.

H. Permittees are required to be in full compliance with Cal/OSHA California Labor Code Section 6300.

I. A current C-57 or C-61 Contractor's License is required for work associated with this permit.

J. Permittee, permittee's contractors, consultants, or agents shall be responsible to assure that all materials or waters generated during drilling, boring destruction, and/or other activities associated with this permit will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statues regulating such. In no case shall these materials and/or waters be allowed to enter, or potentially enter, on- or off-site storm sewers, dry wells, or waterways or be allowed to move off the property where the work is being completed.

K. The driller and consultants (if applicable) shall have an active copy of their Worker's Compensation Insurance on file with District.

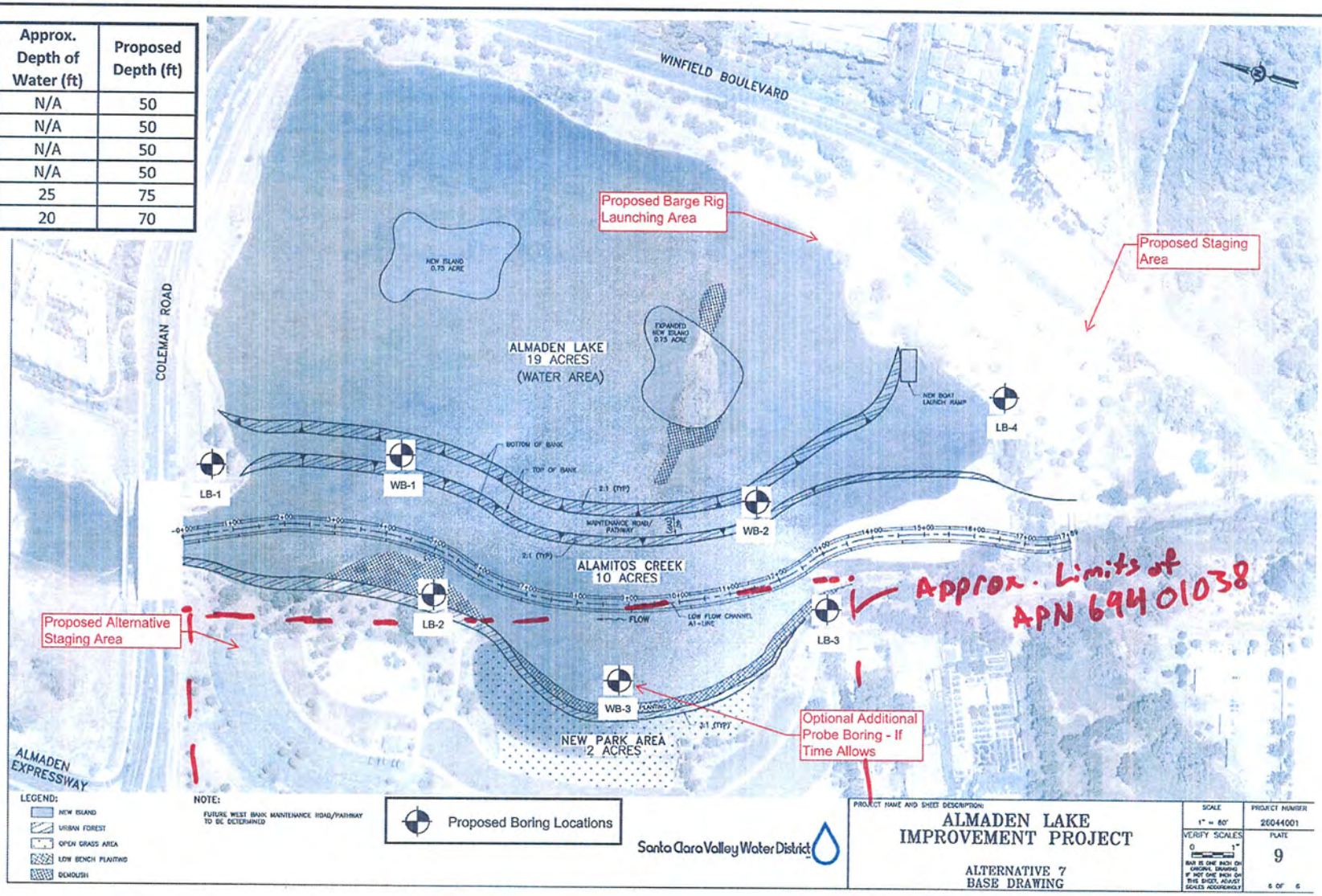
L. This permit shall expire if not exercised within 180 calendar days of its approval, unless an extension of the permit expiration date is granted by an authorized District representative.

M. This permit shall be kept on site during all activities associated with it and shall immediately be presented to an authorized District representative upon request.

Permit Approved by:	Date:

Please allow 10 working days to process this application.

Boring	Approx. Depth of Water (ft)	Proposed Depth (ft)
LB-1	N/A	50
LB-2	N/A	50
LB-3	N/A	50
LB-4	N/A	50
WB-1	25	75
WB-2	20	70



Notes:
1) Environmental samples shall be taken in the upper 2 feet of the exploratory borings;
2) Boring LB-1 shall be performed on a Monday morning - during the park closure;
3) Optional Boring WB-3 depth shall be determined by the thickness of the soft lake sediments

CE&G
CAL ENGINEERING & GEOLOGY
1870 Olympic Blvd.
Suite 100
Walnut Creek, CA 94596
Phone: (925) 935-9771

SANTA CLARA VALLEY WATER DISTRICT
ALAMADEN LAKE IMPROVEMENT PROJECT
SAN JOSE, CALIFORNIA
PROPOSED BORING LCOATIONS

JOB NO. 140540	JULY 2014	PLATE 1

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

APPLICATION TO DRILL EXPLORATORY BORINGS

FC 285 (04-16-13)
Page 1 of 2

Date Issued:	Expiration Date:	District Permit No.:
Client (if different from property owner): Santa Clara Valley Water District	**Property Owner:**	Name of Business/Residence at Site: Lake Almaden
Client's Address: 5750 Almaden Expressway City, State, Zip: San Jose, CA 95118	Property Owner's Address: City, State, Zip	Address of Site: 1037 Coleman Ave City, State, Zip: San Jose, CA
Telephone No.: 408-265-2600	Telephone No.:	Assessor's Parcel No. of Site: 69402027 Book ___ Page ___ Parcel ___

Consulting Company Name: Cal Engineering & Geology	Drilling Company Name: Taber Drilling	
Address: 1870 Olympic Blvd #100	Address: 536 Galvaston St.	
City, State, Zip: Walnut Creek, CA 94596	City, State, Zip: West Sacramento, CA 95691	
Telephone No.: 925-935-9771	Telephone No.: 916-371-8234	C-57/C-61 License No.: 969927
☐ Check if address or phone number has changed	☐ Check if address or phone number has changed	

In space at right, sketch location of proposed boring(s) in sufficient detail to identify location. In addition to distances to nearest street and intersection, show distances to any existing structures, landmarks, or topographic features.

How many borings will be installed on parcel?
5

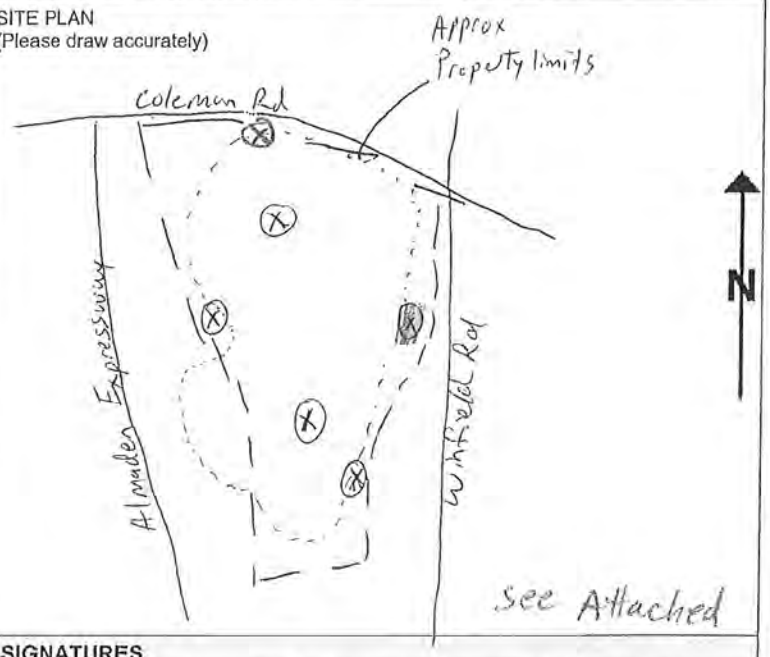
☒ Proposed borings on District property/easement (See General Condition F, page 2.)
☒ Within 50 feet of the top of a creek bank or District facility

Proposed depth of boring(s):
☒ 45 to 150 feet
☐ 151 to 300 feet
☐ Over 300 feet

NOTE: No permit is required for borings under 45 feet deep.

Boring Type:	Boring Use:
☒ Hollow stem	☒ Geotechnical Investigation
☒ Rotary	☐ Environmental Investigation
☐ CPT	☐ Material Emplacement
☐ Hydropunch	☐ Sensor Emplacement
☐ Other: ___	☐ Other: ___

SITE PLAN
(Please draw accurately)



SIGNATURES

I understand and agree that all work associated with this permit is required to be done in accordance with Santa Clara Valley Water District (District) Well Ordinance 90-1, the District Well Standards, and conditions of this permit (see page 2). I certify that the information given in this permit is correct to the best of my knowledge and that the signature below, whether original, electronic, or photocopied, is authorized and valid, and is affixed with the intent to be enforceable. I also certify that a right of entry/encroachment agreement has been formalized between the well owner and property owner, if parties differ.

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Signature of Driller/Agent:	Print/Type Name: Brian Young	Date: 8.4.14
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Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

APPLICATION TO DRILL EXPLORATORY BORINGS

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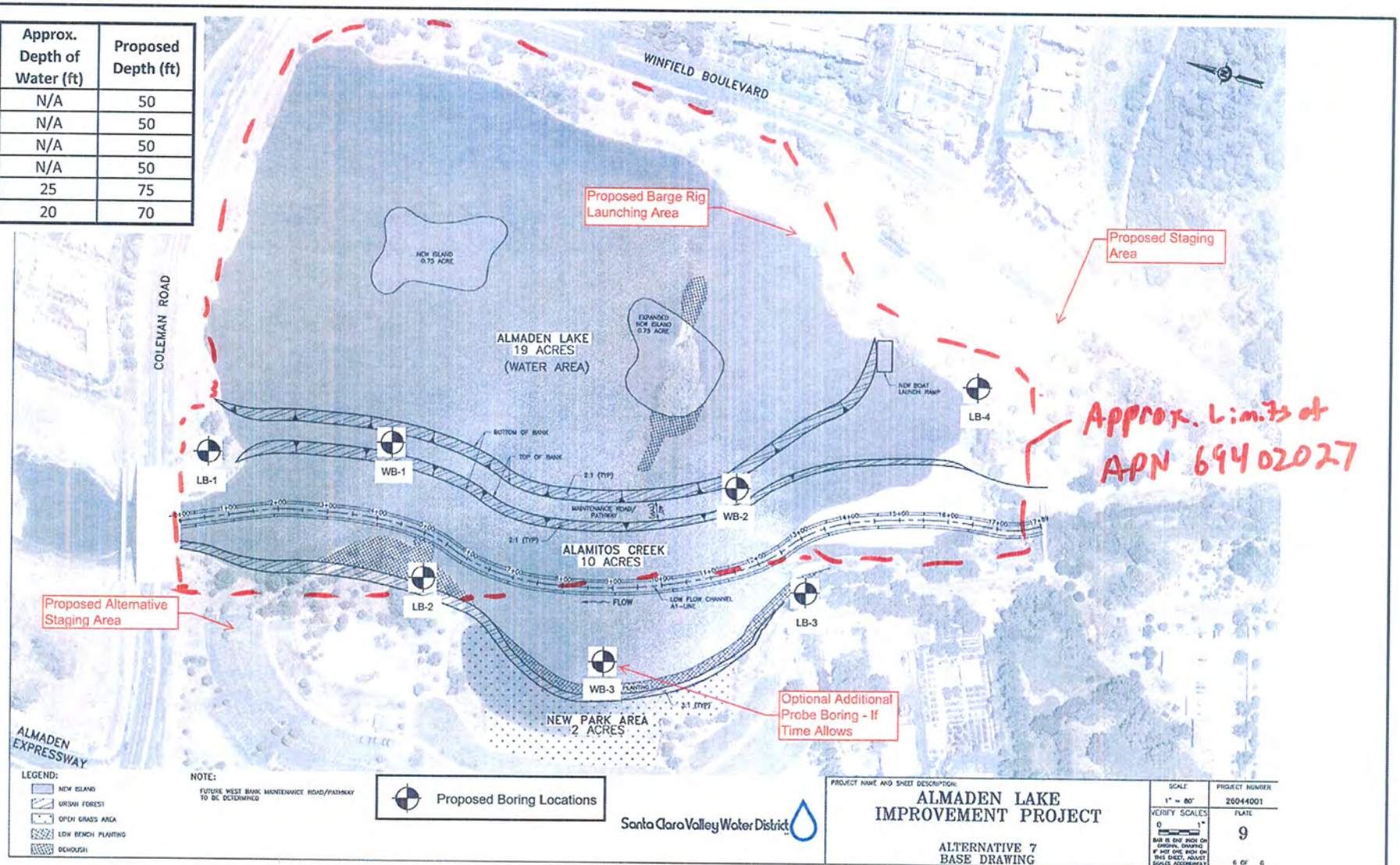
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Permit Approved by:	Date:

Please allow 10 working days to process this application.

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LB-1	N/A	50
LB-2	N/A	50
LB-3	N/A	50
LB-4	N/A	50
WB-1	25	75
WB-2	20	70



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3) Optional Boring WB-3 depth shall be determined by the thickness of the soft lake sediments

CE&G
CAL ENGINEERING & GEOLOGY
1870 Olympic Blvd.
Suite 100
Walnut Creek, CA 94596
Phone: (925) 935-9771

SANTA CLARA VALLEY WATER DISTRICT
ALAMADEN LAKE IMPROVEMENT PROJECT
SAN JOSE, CALIFORNIA
PROPOSED BORING LCOATIONS

JOB NO. 140540	JULY 2014	PLATE 1

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WORK ORDER NUMBER: 14-09-2102

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: ENV Environmental International, Inc.

Client Project Name: TAB1401

Attention: David Solis
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Approved for release on 10/06/2014 by:
Don Burley
Project Manager

ResultLink

Email your PM

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Contents

Client Project Name: TAB1401
Work Order Number: 14-09-2102

1 Work Order Narrative. 3

2 Sample Summary. 4

3 Client Sample Data. 5
3.1 EPA 8015B (M) C6-C44 (Solid). 5
3.2 EPA 6010B/7471A CAC Title 22 Metals (Solid). 7
3.3 EPA 7471A Mercury (Solid). 9
3.4 EPA 8270C Semi-Volatile Organics (Solid). 10
3.5 EPA 8260B Volatile Organics + Oxygenates (Solid). 16

4 Quality Control Sample Data. 22
4.1 MS/MSD. 22
4.2 PDS/PDSD. 27
4.3 LCS/LCSD. 28

5 Sample Analysis Summary. 33

6 Glossary of Terms and Qualifiers. 34

7 Chain-of-Custody/Sample Receipt Form. 35

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Work Order Narrative

Work Order: 14-09-2102 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 09/26/14. They were assigned to Work Order 14-09-2102.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

New York NELAP air certification does not certify for all reported methods and analytes, reference the accredited items here: http://www.calscience.com/PDF/New_York.pdf

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Return to Contents

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Sample Summary

Client:	ENV Environmental International, Inc.	Work Order:	14-09-2102
	1090 Adams Street, Suite D	Project Name:	TAB1401
	Benicia, CA 94510-2953	PO Number:	
		Date/Time Received:	09/26/14 07:55
		Number of Containers:	1
Attn:	David Solis		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
Bin-COMP-1	14-09-2102-1	09/24/14 13:00	1	Solid

Return to Contents

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3550B
		Method:	EPA 8015B (M)
		Units:	mg/kg
Project: TAB1401			Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Bin-COMP-1	**14-09-2102-1-A**	**09/24/14 13:00**	**Solid**	**GC 45**	**09/30/14**	**09/30/14 23:45**	**140930B04B**

Comment(s): - The total concentration includes individual carbon range concentrations (estimated), if any, below the RL reported as ND.

Parameter	Result	RL	DF	Qualifiers
C6	ND	5.0	1.00	
C7	ND	5.0	1.00	
C8	ND	5.0	1.00	
C9-C10	ND	5.0	1.00	
C11-C12	11	5.0	1.00	
C13-C14	37	5.0	1.00	
C15-C16	12	5.0	1.00	
C17-C18	ND	5.0	1.00	
C19-C20	ND	5.0	1.00	
C21-C22	ND	5.0	1.00	
C23-C24	ND	5.0	1.00	
C25-C28	ND	5.0	1.00	
C29-C32	6.2	5.0	1.00	
C33-C36	ND	5.0	1.00	
C37-C40	ND	5.0	1.00	
C41-C44	ND	5.0	1.00	
C6-C44 Total	83	5.0	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	75	61-145	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3550B
		Method:	EPA 8015B (M)
		Units:	mg/kg
Project: TAB1401			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-490-1177**	**N/A**	**Solid**	**GC 45**	**09/30/14**	**09/30/14 22:51**	**140930B04B**

Parameter	Result	RL	DF	Qualifiers
C6	ND	5.0	1.00	
C7	ND	5.0	1.00	
C8	ND	5.0	1.00	
C9-C10	ND	5.0	1.00	
C11-C12	ND	5.0	1.00	
C13-C14	ND	5.0	1.00	
C15-C16	ND	5.0	1.00	
C17-C18	ND	5.0	1.00	
C19-C20	ND	5.0	1.00	
C21-C22	ND	5.0	1.00	
C23-C24	ND	5.0	1.00	
C25-C28	ND	5.0	1.00	
C29-C32	ND	5.0	1.00	
C33-C36	ND	5.0	1.00	
C37-C40	ND	5.0	1.00	
C41-C44	ND	5.0	1.00	
C6-C44 Total	ND	5.0	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	79	61-145	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 3050B
Method: EPA 6010B
Units: mg/kg

Project: TAB1401

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Bin-COMP-1	**14-09-2102-1-A**	**09/24/14 13:00**	**Solid**	**ICP 7300**	**10/01/14**	**10/03/14 21:59**	**141001L21**

Parameter	Result	RL	DF	Qualifiers
Antimony	ND	0.761	1.02	
Arsenic	4.14	0.761	1.02	
Barium	174	0.508	1.02	
Beryllium	0.459	0.254	1.02	
Cadmium	ND	0.508	1.02	
Chromium	66.0	0.254	1.02	
Cobalt	16.0	0.254	1.02	
Copper	49.4	0.508	1.02	
Lead	6.69	0.508	1.02	
Molybdenum	0.490	0.254	1.02	
Nickel	100	0.254	1.02	
Selenium	ND	0.761	1.02	
Silver	ND	0.254	1.02	
Thallium	ND	0.761	1.02	
Vanadium	46.4	0.254	1.02	
Zinc	49.1	1.02	1.02	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3050B
		Method:	EPA 6010B
		Units:	mg/kg
Project: TAB1401			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**097-01-002-19240**	**N/A**	**Solid**	**ICP 7300**	**10/01/14**	**10/03/14 14:01**	**141001L21**

Parameter	Result	RL	DF	Qualifiers
Antimony	ND	0.750	1.00	
Arsenic	ND	0.750	1.00	
Barium	ND	0.500	1.00	
Beryllium	ND	0.250	1.00	
Cadmium	ND	0.500	1.00	
Chromium	ND	0.250	1.00	
Cobalt	ND	0.250	1.00	
Copper	ND	0.500	1.00	
Lead	ND	0.500	1.00	
Molybdenum	ND	0.250	1.00	
Nickel	ND	0.250	1.00	
Selenium	ND	0.750	1.00	
Silver	ND	0.250	1.00	
Thallium	ND	0.750	1.00	
Vanadium	ND	0.250	1.00	
Zinc	ND	1.00	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Project: TAB1401

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 7471A Total
Method: EPA 7471A
Units: mg/kg

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Bin-COMP-1	**14-09-2102-1-A**	**09/24/14 13:00**	**Solid**	**Mercury 05**	**10/02/14**	**10/02/14 21:44**	**141002L05**

Parameter	Result	RL	DF	Qualifiers
Mercury	ND	0.0847	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-16-272-613**	**N/A**	**Solid**	**Mercury 05**	**10/02/14**	**10/02/14 20:48**	**141002L05**

Parameter	Result	RL	DF	Qualifiers
Mercury	ND	0.0833	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 3545
Method: EPA 8270C
Units: mg/kg

Project: TAB1401

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Bin-COMP-1	**14-09-2102-1-A**	**09/24/14 13:00**	**Solid**	**GC/MS SS**	**09/30/14**	**10/01/14 15:57**	**140930L12**

Parameter	Result	RL	DF	Qualifiers
Acenaphthene	ND	0.50	1.00	
Acenaphthylene	ND	0.50	1.00	
Aniline	ND	0.50	1.00	
Anthracene	ND	0.50	1.00	
Azobenzene	ND	0.50	1.00	
Benzidine	ND	10	1.00	
Benzo (a) Anthracene	ND	0.50	1.00	
Benzo (a) Pyrene	ND	0.50	1.00	
Benzo (b) Fluoranthene	ND	0.50	1.00	
Benzo (g,h,i) Perylene	ND	0.50	1.00	
Benzo (k) Fluoranthene	ND	0.50	1.00	
Benzoic Acid	ND	2.5	1.00	
Benzyl Alcohol	ND	0.50	1.00	
Bis(2-Chloroethoxy) Methane	ND	0.50	1.00	
Bis(2-Chloroethyl) Ether	ND	2.5	1.00	
Bis(2-Chloroisopropyl) Ether	ND	0.50	1.00	
Bis(2-Ethylhexyl) Phthalate	0.61	0.50	1.00	
4-Bromophenyl-Phenyl Ether	ND	0.50	1.00	
Butyl Benzyl Phthalate	ND	0.50	1.00	
4-Chloro-3-Methylphenol	ND	0.50	1.00	
4-Chloroaniline	ND	0.50	1.00	
2-Chloronaphthalene	ND	0.50	1.00	
2-Chlorophenol	ND	0.50	1.00	
4-Chlorophenyl-Phenyl Ether	ND	0.50	1.00	
Chrysene	ND	0.50	1.00	
Di-n-Butyl Phthalate	ND	0.50	1.00	
Di-n-Octyl Phthalate	ND	0.50	1.00	
Dibenz (a,h) Anthracene	ND	0.50	1.00	
Dibenzofuran	ND	0.50	1.00	
1,2-Dichlorobenzene	ND	0.50	1.00	
1,3-Dichlorobenzene	ND	0.50	1.00	
1,4-Dichlorobenzene	ND	0.50	1.00	
3,3'-Dichlorobenzidine	ND	10	1.00	
2,4-Dichlorophenol	ND	0.50	1.00	
Diethyl Phthalate	ND	0.50	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Return to Contents

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Analytical Report

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 3545
Method: EPA 8270C
Units: mg/kg

Project: TAB1401

Parameter	Result	RL	DF	Qualifiers
Dimethyl Phthalate	ND	0.50	1.00	
2,4-Dimethylphenol	ND	0.50	1.00	
4,6-Dinitro-2-Methylphenol	ND	2.5	1.00	
2,4-Dinitrophenol	ND	2.5	1.00	
2,4-Dinitrotoluene	ND	0.50	1.00	
2,6-Dinitrotoluene	ND	0.50	1.00	
Fluoranthene	ND	0.50	1.00	
Fluorene	ND	0.50	1.00	
Hexachloro-1,3-Butadiene	ND	0.50	1.00	
Hexachlorobenzene	ND	0.50	1.00	
Hexachlorocyclopentadiene	ND	2.5	1.00	
Hexachloroethane	ND	0.50	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	0.50	1.00	
Isophorone	ND	0.50	1.00	
2-Methylnaphthalene	ND	0.50	1.00	
1-Methylnaphthalene	ND	0.50	1.00	
2-Methylphenol	ND	0.50	1.00	
3/4-Methylphenol	ND	0.50	1.00	
N-Nitroso-di-n-propylamine	ND	0.50	1.00	
N-Nitrosodimethylamine	ND	0.50	1.00	
N-Nitrosodiphenylamine	ND	0.50	1.00	
Naphthalene	ND	0.50	1.00	
4-Nitroaniline	ND	0.50	1.00	
3-Nitroaniline	ND	0.50	1.00	
2-Nitroaniline	ND	0.50	1.00	
Nitrobenzene	ND	2.5	1.00	
4-Nitrophenol	ND	0.50	1.00	
2-Nitrophenol	ND	0.50	1.00	
Pentachlorophenol	ND	2.5	1.00	
Phenanthrene	ND	0.50	1.00	
Phenol	ND	0.50	1.00	
Pyrene	ND	0.50	1.00	
Pyridine	ND	0.50	1.00	
1,2,4-Trichlorobenzene	ND	0.50	1.00	
2,4,6-Trichlorophenol	ND	0.50	1.00	
2,4,5-Trichlorophenol	ND	0.50	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	85	27-120	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Return to Contents

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Analytical Report

ENV Environmental International, Inc.	Date Received:	09/26/14
1090 Adams Street, Suite D	Work Order:	14-09-2102
Benicia, CA 94510-2953	Preparation:	EPA 3545
	Method:	EPA 8270C
	Units:	mg/kg
Project: TAB1401		Page 3 of 6

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorophenol	83	25-120	
Nitrobenzene-d5	82	33-123	
p-Terphenyl-d14	82	27-159	
Phenol-d6	85	26-122	
2,4,6-Tribromophenol	92	18-138	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 3545
Method: EPA 8270C
Units: mg/kg

Project: TAB1401

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-549-3077**	**N/A**	**Solid**	**GC/MS SS**	**09/30/14**	**10/01/14 14:42**	**140930L12**

Parameter	Result	RL	DF	Qualifiers
Acenaphthene	ND	0.50	1.00	
Acenaphthylene	ND	0.50	1.00	
Aniline	ND	0.50	1.00	
Anthracene	ND	0.50	1.00	
Azobenzene	ND	0.50	1.00	
Benzidine	ND	10	1.00	
Benzo (a) Anthracene	ND	0.50	1.00	
Benzo (a) Pyrene	ND	0.50	1.00	
Benzo (b) Fluoranthene	ND	0.50	1.00	
Benzo (g,h,i) Perylene	ND	0.50	1.00	
Benzo (k) Fluoranthene	ND	0.50	1.00	
Benzoic Acid	ND	2.5	1.00	
Benzyl Alcohol	ND	0.50	1.00	
Bis(2-Chloroethoxy) Methane	ND	0.50	1.00	
Bis(2-Chloroethyl) Ether	ND	2.5	1.00	
Bis(2-Chloroisopropyl) Ether	ND	0.50	1.00	
Bis(2-Ethylhexyl) Phthalate	ND	0.50	1.00	
4-Bromophenyl-Phenyl Ether	ND	0.50	1.00	
Butyl Benzyl Phthalate	ND	0.50	1.00	
4-Chloro-3-Methylphenol	ND	0.50	1.00	
4-Chloroaniline	ND	0.50	1.00	
2-Chloronaphthalene	ND	0.50	1.00	
2-Chlorophenol	ND	0.50	1.00	
4-Chlorophenyl-Phenyl Ether	ND	0.50	1.00	
Chrysene	ND	0.50	1.00	
Di-n-Butyl Phthalate	ND	0.50	1.00	
Di-n-Octyl Phthalate	ND	0.50	1.00	
Dibenz (a,h) Anthracene	ND	0.50	1.00	
Dibenzofuran	ND	0.50	1.00	
1,2-Dichlorobenzene	ND	0.50	1.00	
1,3-Dichlorobenzene	ND	0.50	1.00	
1,4-Dichlorobenzene	ND	0.50	1.00	
3,3'-Dichlorobenzidine	ND	10	1.00	
2,4-Dichlorophenol	ND	0.50	1.00	
Diethyl Phthalate	ND	0.50	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Return to Contents

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Analytical Report

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 3545
Method: EPA 8270C
Units: mg/kg

Project: TAB1401

Parameter	Result	RL	DF	Qualifiers
Dimethyl Phthalate	ND	0.50	1.00	
2,4-Dimethylphenol	ND	0.50	1.00	
4,6-Dinitro-2-Methylphenol	ND	2.5	1.00	
2,4-Dinitrophenol	ND	2.5	1.00	
2,4-Dinitrotoluene	ND	0.50	1.00	
2,6-Dinitrotoluene	ND	0.50	1.00	
Fluoranthene	ND	0.50	1.00	
Fluorene	ND	0.50	1.00	
Hexachloro-1,3-Butadiene	ND	0.50	1.00	
Hexachlorobenzene	ND	0.50	1.00	
Hexachlorocyclopentadiene	ND	2.5	1.00	
Hexachloroethane	ND	0.50	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	0.50	1.00	
Isophorone	ND	0.50	1.00	
2-Methylnaphthalene	ND	0.50	1.00	
1-Methylnaphthalene	ND	0.50	1.00	
2-Methylphenol	ND	0.50	1.00	
3/4-Methylphenol	ND	0.50	1.00	
N-Nitroso-di-n-propylamine	ND	0.50	1.00	
N-Nitrosodimethylamine	ND	0.50	1.00	
N-Nitrosodiphenylamine	ND	0.50	1.00	
Naphthalene	ND	0.50	1.00	
4-Nitroaniline	ND	0.50	1.00	
3-Nitroaniline	ND	0.50	1.00	
2-Nitroaniline	ND	0.50	1.00	
Nitrobenzene	ND	2.5	1.00	
4-Nitrophenol	ND	0.50	1.00	
2-Nitrophenol	ND	0.50	1.00	
Pentachlorophenol	ND	2.5	1.00	
Phenanthrene	ND	0.50	1.00	
Phenol	ND	0.50	1.00	
Pyrene	ND	0.50	1.00	
Pyridine	ND	0.50	1.00	
1,2,4-Trichlorobenzene	ND	0.50	1.00	
2,4,6-Trichlorophenol	ND	0.50	1.00	
2,4,5-Trichlorophenol	ND	0.50	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	87	27-120	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Return to Contents

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Analytical Report

ENV Environmental International, Inc.	Date Received:	09/26/14
1090 Adams Street, Suite D	Work Order:	14-09-2102
Benicia, CA 94510-2953	Preparation:	EPA 3545
	Method:	EPA 8270C
	Units:	mg/kg
Project: TAB1401		Page 6 of 6

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorophenol	96	25-120	
Nitrobenzene-d5	87	33-123	
p-Terphenyl-d14	85	27-159	
Phenol-d6	89	26-122	
2,4,6-Tribromophenol	100	18-138	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 5030C
Method: EPA 8260B
Units: ug/kg

Project: TAB1401

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Bin-COMP-1	**14-09-2102-1-A**	**09/24/14 13:00**	**Solid**	**GC/MS Q**	**09/26/14**	**09/27/14 11:38**	**140927L009**

Parameter	Result	RL	DF	Qualifiers
Acetone	ND	130	1.00	
Benzene	ND	5.1	1.00	
Bromobenzene	ND	5.1	1.00	
Bromochloromethane	ND	5.1	1.00	
Bromodichloromethane	ND	5.1	1.00	
Bromoform	ND	5.1	1.00	
Bromomethane	ND	25	1.00	
2-Butanone	ND	51	1.00	
n-Butylbenzene	ND	5.1	1.00	
sec-Butylbenzene	ND	5.1	1.00	
tert-Butylbenzene	ND	5.1	1.00	
Carbon Disulfide	ND	51	1.00	
Carbon Tetrachloride	ND	5.1	1.00	
Chlorobenzene	ND	5.1	1.00	
Chloroethane	ND	5.1	1.00	
Chloroform	ND	5.1	1.00	
Chloromethane	ND	25	1.00	
2-Chlorotoluene	ND	5.1	1.00	
4-Chlorotoluene	ND	5.1	1.00	
Dibromochloromethane	ND	5.1	1.00	
1,2-Dibromo-3-Chloropropane	ND	10	1.00	
1,2-Dibromoethane	ND	5.1	1.00	
Dibromomethane	ND	5.1	1.00	
1,2-Dichlorobenzene	ND	5.1	1.00	
1,3-Dichlorobenzene	ND	5.1	1.00	
1,4-Dichlorobenzene	ND	5.1	1.00	
Dichlorodifluoromethane	ND	5.1	1.00	
1,1-Dichloroethane	ND	5.1	1.00	
1,2-Dichloroethane	ND	5.1	1.00	
1,1-Dichloroethene	ND	5.1	1.00	
c-1,2-Dichloroethene	ND	5.1	1.00	
t-1,2-Dichloroethene	ND	5.1	1.00	
1,2-Dichloropropane	ND	5.1	1.00	
1,3-Dichloropropane	ND	5.1	1.00	
2,2-Dichloropropane	ND	5.1	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 5030C
Method: EPA 8260B
Units: ug/kg

Project: TAB1401

Parameter	Result	RL	DF	Qualifiers
1,1-Dichloropropene	ND	5.1	1.00	
c-1,3-Dichloropropene	ND	5.1	1.00	
t-1,3-Dichloropropene	ND	5.1	1.00	
Ethylbenzene	ND	5.1	1.00	
2-Hexanone	ND	51	1.00	
Isopropylbenzene	ND	5.1	1.00	
p-Isopropyltoluene	ND	5.1	1.00	
Methylene Chloride	ND	51	1.00	
4-Methyl-2-Pentanone	ND	51	1.00	
Naphthalene	ND	51	1.00	
n-Propylbenzene	ND	5.1	1.00	
Styrene	ND	5.1	1.00	
1,1,1,2-Tetrachloroethane	ND	5.1	1.00	
1,1,2,2-Tetrachloroethane	ND	5.1	1.00	
Tetrachloroethene	ND	5.1	1.00	
Toluene	ND	5.1	1.00	
1,2,3-Trichlorobenzene	ND	10	1.00	
1,2,4-Trichlorobenzene	ND	5.1	1.00	
1,1,1-Trichloroethane	ND	5.1	1.00	
1,1,2-Trichloroethane	ND	5.1	1.00	
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	51	1.00	
Trichloroethene	ND	5.1	1.00	
1,2,3-Trichloropropane	ND	5.1	1.00	
1,2,4-Trimethylbenzene	ND	5.1	1.00	
Trichlorofluoromethane	ND	51	1.00	
1,3,5-Trimethylbenzene	ND	5.1	1.00	
Vinyl Acetate	ND	51	1.00	
Vinyl Chloride	ND	5.1	1.00	
p/m-Xylene	ND	5.1	1.00	
o-Xylene	ND	5.1	1.00	
Methyl-t-Butyl Ether (MTBE)	ND	5.1	1.00	
Tert-Butyl Alcohol (TBA)	ND	51	1.00	
Diisopropyl Ether (DIPE)	ND	10	1.00	
Ethyl-t-Butyl Ether (ETBE)	ND	10	1.00	
Tert-Amyl-Methyl Ether (TAME)	ND	10	1.00	
Ethanol	ND	250	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
1,4-Bromofluorobenzene	98	60-132	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Return to Contents

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Analytical Report

ENV Environmental International, Inc.	Date Received:	09/26/14
1090 Adams Street, Suite D	Work Order:	14-09-2102
Benicia, CA 94510-2953	Preparation:	EPA 5030C
	Method:	EPA 8260B
	Units:	ug/kg
Project: TAB1401		Page 3 of 6

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	98	63-141	
1,2-Dichloroethane-d4	102	62-146	
Toluene-d8	97	80-120	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 5030C
Method: EPA 8260B
Units: ug/kg

Project: TAB1401

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-796-8919**	**N/A**	**Solid**	**GC/MS Q**	**09/27/14**	**09/27/14 10:46**	**140927L009**

Parameter	Result	RL	DF	Qualifiers
Acetone	ND	120	1.00	
Benzene	ND	5.0	1.00	
Bromobenzene	ND	5.0	1.00	
Bromochloromethane	ND	5.0	1.00	
Bromodichloromethane	ND	5.0	1.00	
Bromoform	ND	5.0	1.00	
Bromomethane	ND	25	1.00	
2-Butanone	ND	50	1.00	
n-Butylbenzene	ND	5.0	1.00	
sec-Butylbenzene	ND	5.0	1.00	
tert-Butylbenzene	ND	5.0	1.00	
Carbon Disulfide	ND	50	1.00	
Carbon Tetrachloride	ND	5.0	1.00	
Chlorobenzene	ND	5.0	1.00	
Chloroethane	ND	5.0	1.00	
Chloroform	ND	5.0	1.00	
Chloromethane	ND	25	1.00	
2-Chlorotoluene	ND	5.0	1.00	
4-Chlorotoluene	ND	5.0	1.00	
Dibromochloromethane	ND	5.0	1.00	
1,2-Dibromo-3-Chloropropane	ND	10	1.00	
1,2-Dibromoethane	ND	5.0	1.00	
Dibromomethane	ND	5.0	1.00	
1,2-Dichlorobenzene	ND	5.0	1.00	
1,3-Dichlorobenzene	ND	5.0	1.00	
1,4-Dichlorobenzene	ND	5.0	1.00	
Dichlorodifluoromethane	ND	5.0	1.00	
1,1-Dichloroethane	ND	5.0	1.00	
1,2-Dichloroethane	ND	5.0	1.00	
1,1-Dichloroethene	ND	5.0	1.00	
c-1,2-Dichloroethene	ND	5.0	1.00	
t-1,2-Dichloroethene	ND	5.0	1.00	
1,2-Dichloropropane	ND	5.0	1.00	
1,3-Dichloropropane	ND	5.0	1.00	
2,2-Dichloropropane	ND	5.0	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 5030C
Method: EPA 8260B
Units: ug/kg

Project: TAB1401

Parameter	Result	RL	DF	Qualifiers
1,1-Dichloropropene	ND	5.0	1.00	
c-1,3-Dichloropropene	ND	5.0	1.00	
t-1,3-Dichloropropene	ND	5.0	1.00	
Ethylbenzene	ND	5.0	1.00	
2-Hexanone	ND	50	1.00	
Isopropylbenzene	ND	5.0	1.00	
p-Isopropyltoluene	ND	5.0	1.00	
Methylene Chloride	ND	50	1.00	
4-Methyl-2-Pentanone	ND	50	1.00	
Naphthalene	ND	50	1.00	
n-Propylbenzene	ND	5.0	1.00	
Styrene	ND	5.0	1.00	
1,1,1,2-Tetrachloroethane	ND	5.0	1.00	
1,1,2,2-Tetrachloroethane	ND	5.0	1.00	
Tetrachloroethene	ND	5.0	1.00	
Toluene	ND	5.0	1.00	
1,2,3-Trichlorobenzene	ND	10	1.00	
1,2,4-Trichlorobenzene	ND	5.0	1.00	
1,1,1-Trichloroethane	ND	5.0	1.00	
1,1,2-Trichloroethane	ND	5.0	1.00	
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	50	1.00	
Trichloroethene	ND	5.0	1.00	
1,2,3-Trichloropropane	ND	5.0	1.00	
1,2,4-Trimethylbenzene	ND	5.0	1.00	
Trichlorofluoromethane	ND	50	1.00	
1,3,5-Trimethylbenzene	ND	5.0	1.00	
Vinyl Acetate	ND	50	1.00	
Vinyl Chloride	ND	5.0	1.00	
p/m-Xylene	ND	5.0	1.00	
o-Xylene	ND	5.0	1.00	
Methyl-t-Butyl Ether (MTBE)	ND	5.0	1.00	
Tert-Butyl Alcohol (TBA)	ND	50	1.00	
Diisopropyl Ether (DIPE)	ND	10	1.00	
Ethyl-t-Butyl Ether (ETBE)	ND	10	1.00	
Tert-Amyl-Methyl Ether (TAME)	ND	10	1.00	
Ethanol	ND	250	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
1,4-Bromofluorobenzene	97	60-132	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.	Date Received:	09/26/14
1090 Adams Street, Suite D	Work Order:	14-09-2102
Benicia, CA 94510-2953	Preparation:	EPA 5030C
	Method:	EPA 8260B
	Units:	ug/kg
Project: TAB1401		Page 6 of 6

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	99	63-141	
1,2-Dichloroethane-d4	101	62-146	
Toluene-d8	96	80-120	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3550B
		Method:	EPA 8015B (M)
Project: TAB1401			Page 1 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
14-09-2173-6	**Sample**	**Solid**	**GC 45**	**09/30/14**	**10/01/14 02:07**	**140930S04**
14-09-2173-6	**Matrix Spike**	**Solid**	**GC 45**	**09/30/14**	**10/01/14 00:02**	**140930S04**
14-09-2173-6	**Matrix Spike Duplicate**	**Solid**	**GC 45**	**09/30/14**	**10/01/14 00:21**	**140930S04**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	21.65	400.0	337.0	79	340.3	80	71-125	1	0-12	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3050B
		Method:	EPA 6010B
Project: TAB1401			Page 2 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
14-09-2173-3	**Sample**	**Solid**	**ICP 7300**	**10/01/14**	**10/03/14 14:05**	**141001S21**
14-09-2173-3	**Matrix Spike**	**Solid**	**ICP 7300**	**10/01/14**	**10/03/14 14:06**	**141001S21**
14-09-2173-3	**Matrix Spike Duplicate**	**Solid**	**ICP 7300**	**10/01/14**	**10/03/14 14:07**	**141001S21**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Antimony	ND	25.00	5.789	23	6.460	26	80-120	11	0-20	3
Arsenic	1.737	25.00	26.53	99	27.54	103	80-120	4	0-20	
Barium	56.36	25.00	79.61	93	108.8	210	80-120	31	0-20	3,4
Beryllium	ND	25.00	26.12	104	27.08	108	80-120	4	0-20	
Cadmium	ND	25.00	24.89	100	25.60	102	80-120	3	0-20	
Chromium	9.886	25.00	35.01	100	36.04	105	80-120	3	0-20	
Cobalt	4.562	25.00	29.89	101	30.63	104	80-120	2	0-20	
Copper	7.298	25.00	32.32	100	33.44	105	80-120	3	0-20	
Lead	38.60	25.00	35.32	0	35.13	0	80-120	1	0-20	3
Molybdenum	ND	25.00	21.66	87	21.75	87	80-120	0	0-20	
Nickel	8.413	25.00	33.59	101	34.37	104	80-120	2	0-20	
Selenium	ND	25.00	23.06	92	24.17	97	80-120	5	0-20	
Silver	ND	12.50	11.82	95	12.12	97	80-120	2	0-20	
Thallium	ND	25.00	23.14	93	23.60	94	80-120	2	0-20	
Vanadium	19.89	25.00	42.81	92	44.53	99	80-120	4	0-20	
Zinc	24.76	25.00	45.67	84	52.08	109	80-120	13	0-20	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 7471A Total
		Method:	EPA 7471A
Project: TAB1401			Page 3 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
14-09-2112-4	**Sample**	**Solid**	**Mercury 05**	**10/02/14**	**10/02/14 20:52**	**141002S05**
14-09-2112-4	**Matrix Spike**	**Solid**	**Mercury 05**	**10/02/14**	**10/02/14 20:55**	**141002S05**
14-09-2112-4	**Matrix Spike Duplicate**	**Solid**	**Mercury 05**	**10/02/14**	**10/02/14 20:57**	**141002S05**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Mercury	ND	0.8350	0.8560	103	0.8557	102	71-137	0	0-14	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3545
		Method:	EPA 8270C
Project: TAB1401			Page 4 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
Bin-COMP-1	**Sample**	**Solid**	**GC/MS SS**	**09/30/14**	**10/01/14 15:57**	**140930S12**
Bin-COMP-1	**Matrix Spike**	**Solid**	**GC/MS SS**	**09/30/14**	**10/01/14 16:15**	**140930S12**
Bin-COMP-1	**Matrix Spike Duplicate**	**Solid**	**GC/MS SS**	**09/30/14**	**10/01/14 17:12**	**140930S12**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acenaphthene	ND	10.00	6.857	69	6.827	68	34-148	0	0-20	
Acenaphthylene	ND	10.00	6.983	70	6.934	69	53-120	1	0-20	
Butyl Benzyl Phthalate	ND	10.00	6.678	67	6.870	69	15-189	3	0-20	
4-Chloro-3-Methylphenol	ND	10.00	7.085	71	7.105	71	32-120	0	0-20	
2-Chlorophenol	ND	10.00	6.986	70	6.945	69	53-120	1	0-20	
1,4-Dichlorobenzene	ND	10.00	6.621	66	6.555	66	43-120	1	0-26	
Dimethyl Phthalate	ND	10.00	6.698	67	6.645	66	44-122	1	0-20	
2,4-Dinitrotoluene	ND	10.00	6.456	65	6.461	65	28-120	0	0-20	
Fluorene	ND	10.00	6.878	69	6.870	69	12-186	0	0-20	
N-Nitroso-di-n-propylamine	ND	10.00	6.782	68	6.799	68	38-140	0	0-20	
Naphthalene	ND	10.00	6.858	69	6.788	68	20-140	1	0-20	
4-Nitrophenol	ND	10.00	5.442	54	5.402	54	14-128	1	0-59	
Pentachlorophenol	ND	10.00	6.204	62	6.042	60	10-124	3	0-20	
Phenol	ND	10.00	7.140	71	7.084	71	22-124	1	0-20	
Pyrene	ND	10.00	6.736	67	6.966	70	31-169	3	0-20	
1,2,4-Trichlorobenzene	ND	10.00	6.623	66	6.552	66	56-120	1	0-20	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 5030C
		Method:	EPA 8260B
Project: TAB1401			Page 5 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
Bin-COMP-1	**Sample**	**Solid**	**GC/MS Q**	**09/26/14**	**09/27/14 11:38**	**140927S004**
Bin-COMP-1	**Matrix Spike**	**Solid**	**GC/MS Q**	**09/26/14**	**09/27/14 12:04**	**140927S004**
Bin-COMP-1	**Matrix Spike Duplicate**	**Solid**	**GC/MS Q**	**09/26/14**	**09/27/14 12:31**	**140927S004**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Benzene	ND	50.00	46.21	92	44.92	90	61-127	3	0-20	
Carbon Tetrachloride	ND	50.00	47.71	95	47.48	95	51-135	0	0-29	
Chlorobenzene	ND	50.00	44.96	90	44.46	89	57-123	1	0-20	
1,2-Dibromoethane	ND	50.00	47.41	95	47.31	95	64-124	0	0-20	
1,2-Dichlorobenzene	ND	50.00	41.54	83	41.79	84	35-131	1	0-25	
1,2-Dichloroethane	ND	50.00	45.21	90	44.03	88	80-120	3	0-20	
1,1-Dichloroethene	ND	50.00	45.27	91	43.57	87	47-143	4	0-25	
Ethylbenzene	ND	50.00	42.92	86	43.00	86	57-129	0	0-22	
Toluene	ND	50.00	45.21	90	44.14	88	63-123	2	0-20	
Trichloroethene	ND	50.00	60.55	121	51.53	103	44-158	16	0-20	
Vinyl Chloride	ND	50.00	39.05	78	39.76	80	49-139	2	0-47	
p/m-Xylene	ND	100.0	88.12	88	88.08	88	70-130	0	0-30	
o-Xylene	ND	50.00	45.13	90	45.15	90	70-130	0	0-30	
Methyl-t-Butyl Ether (MTBE)	ND	50.00	47.41	95	47.23	94	57-123	0	0-21	
Tert-Butyl Alcohol (TBA)	ND	250.0	260.3	104	247.0	99	30-168	5	0-34	
Diisopropyl Ether (DIPE)	ND	50.00	47.09	94	46.35	93	57-129	2	0-20	
Ethyl-t-Butyl Ether (ETBE)	ND	50.00	48.54	97	48.25	97	55-127	1	0-20	
Tert-Amyl-Methyl Ether (TAME)	ND	50.00	49.44	99	48.77	98	58-124	1	0-20	
Ethanol	ND	500.0	462.9	93	432.7	87	17-167	7	0-47	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - PDS

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3050B
		Method:	EPA 6010B
Project: TAB1401			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
14-09-2173-3	**Sample**	**Solid**	**ICP 7300**	**10/01/14 00:00**	**10/03/14 14:05**	**141001S21**
14-09-2173-3	**PDS**	**Solid**	**ICP 7300**	**10/01/14 00:00**	**10/03/14 14:08**	**141001S21**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Antimony	ND	25.00	26.35	105	75-125	
Arsenic	1.737	25.00	28.18	106	75-125	
Barium	56.36	25.00	80.18	95	75-125	
Beryllium	ND	25.00	26.50	106	75-125	
Cadmium	ND	25.00	25.26	101	75-125	
Chromium	9.886	25.00	35.71	103	75-125	
Cobalt	4.562	25.00	30.39	103	75-125	
Copper	7.298	25.00	32.87	102	75-125	
Lead	38.60	25.00	64.39	103	75-125	
Molybdenum	ND	25.00	24.96	100	75-125	
Nickel	8.413	25.00	34.11	103	75-125	
Selenium	ND	25.00	25.94	104	75-125	
Silver	ND	12.50	12.53	100	75-125	
Thallium	ND	25.00	23.24	93	75-125	
Vanadium	19.89	25.00	44.24	97	75-125	
Zinc	24.76	25.00	48.42	95	75-125	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3550B
		Method:	EPA 8015B (M)
Project: TAB1401			Page 1 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-15-490-1177	**LCS**	**Solid**	**GC 45**	**09/30/14**	**09/30/14 23:09**	**140930B04B**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
TPH as Diesel	400.0	315.6	79	75-123	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3050B
		Method:	EPA 6010B
Project: TAB1401			Page 2 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
097-01-002-19240	**LCS**	**Solid**	**ICP 7300**	**10/01/14**	**10/03/14 14:03**	**141001L21**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
Antimony	25.00	26.52	106	80-120	73-127	
Arsenic	25.00	25.84	103	80-120	73-127	
Barium	25.00	25.81	103	80-120	73-127	
Beryllium	25.00	25.42	102	80-120	73-127	
Cadmium	25.00	27.30	109	80-120	73-127	
Chromium	25.00	27.05	108	80-120	73-127	
Cobalt	25.00	28.06	112	80-120	73-127	
Copper	25.00	25.66	103	80-120	73-127	
Lead	25.00	28.20	113	80-120	73-127	
Molybdenum	25.00	25.38	102	80-120	73-127	
Nickel	25.00	28.28	113	80-120	73-127	
Selenium	25.00	25.38	102	80-120	73-127	
Silver	12.50	11.84	95	80-120	73-127	
Thallium	25.00	26.70	107	80-120	73-127	
Vanadium	25.00	24.79	99	80-120	73-127	
Zinc	25.00	26.51	106	80-120	73-127	

Total number of LCS compounds: 16
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 7471A Total
		Method:	EPA 7471A
Project: TAB1401			Page 3 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-272-613	**LCS**	**Solid**	**Mercury 05**	**10/02/14**	**10/02/14 20:50**	**141002L05**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Mercury	0.8350	0.7373	88	85-121	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3545
		Method:	EPA 8270C
Project: TAB1401			Page 4 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-12-549-3077	**LCS**	**Solid**	**GC/MS SS**	**09/30/14**	**10/01/14 15:00**	**140930L12**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
Acenaphthene	10.00	8.199	82	51-123	39-135	
Acenaphthylene	10.00	8.284	83	52-120	41-131	
Butyl Benzyl Phthalate	10.00	8.478	85	43-139	27-155	
4-Chloro-3-Methylphenol	10.00	8.453	85	55-121	44-132	
2-Chlorophenol	10.00	7.493	75	58-124	47-135	
1,4-Dichlorobenzene	10.00	7.039	70	42-132	27-147	
Dimethyl Phthalate	10.00	8.382	84	51-123	39-135	
2,4-Dinitrotoluene	10.00	8.262	83	51-129	38-142	
Fluorene	10.00	8.431	84	54-126	42-138	
N-Nitroso-di-n-propylamine	10.00	7.717	77	40-136	24-152	
Naphthalene	10.00	7.611	76	32-146	13-165	
4-Nitrophenol	10.00	6.880	69	24-126	7-143	
Pentachlorophenol	10.00	7.598	76	23-131	5-149	
Phenol	10.00	7.763	78	40-130	25-145	
Pyrene	10.00	8.527	85	47-143	31-159	
1,2,4-Trichlorobenzene	10.00	7.175	72	45-129	31-143	

Total number of LCS compounds: 16
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 5030C
		Method:	EPA 8260B
Project: TAB1401			Page 5 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-12-796-8919	**LCS**	**Solid**	**GC/MS Q**	**09/27/14**	**09/27/14 09:48**	**140927L009**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
Benzene	50.00	50.34	101	78-120	71-127	
Carbon Tetrachloride	50.00	54.81	110	49-139	34-154	
Chlorobenzene	50.00	52.38	105	79-120	72-127	
1,2-Dibromoethane	50.00	49.31	99	80-120	73-127	
1,2-Dichlorobenzene	50.00	51.16	102	75-120	68-128	
1,2-Dichloroethane	50.00	48.20	96	80-120	73-127	
1,1-Dichloroethene	50.00	49.78	100	74-122	66-130	
Ethylbenzene	50.00	50.87	102	76-120	69-127	
Toluene	50.00	50.44	101	77-120	70-127	
Trichloroethene	50.00	47.66	95	80-120	73-127	
Vinyl Chloride	50.00	44.82	90	68-122	59-131	
p/m-Xylene	100.0	107.0	107	75-125	67-133	
o-Xylene	50.00	54.15	108	75-125	67-133	
Methyl-t-Butyl Ether (MTBE)	50.00	47.48	95	77-120	70-127	
Tert-Butyl Alcohol (TBA)	250.0	264.5	106	68-122	59-131	
Diisopropyl Ether (DIPE)	50.00	48.86	98	78-120	71-127	
Ethyl-t-Butyl Ether (ETBE)	50.00	49.83	100	78-120	71-127	
Tert-Amyl-Methyl Ether (TAME)	50.00	50.26	101	75-120	68-128	
Ethanol	500.0	453.1	91	56-140	42-154	

Total number of LCS compounds: 19
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

RPD: Relative Percent Difference. CL: Control Limits

Return to Contents

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Sample Analysis Summary Report

Work Order: 14-09-2102 Page 1 of 1

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 6010B	EPA 3050B	469	ICP 7300	1
EPA 7471A	EPA 7471A Total	915	Mercury 05	1
EPA 8015B (M)	EPA 3550B	682	GC 45	1
EPA 8260B	EPA 5030C	823	GC/MS Q	2
EPA 8270C	EPA 3545	608	GC/MS SS	1

Return to Contents

Location 1: 7440 Lincoln Way, Garden Grove, CA 92841
Location 2: 7445 Lampson Avenue, Garden Grove, CA 92841

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Glossary of Terms and Qualifiers

Work Order: 14-09-2102 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

Return to Contents

ENV
1090 Adams St., Ste D
BENICIA, CA 94510
TEL: (707) 751-3817 . FAX: (707) 751-3897

CHAIN OF CUSTODY RECORD

DATE: 09/25/14

PAGE: 1 OF 1

LABORATORY CLIENT: ENV America, Inc.

ADDRESS: 1090 Adams St., Ste D

CITY: Benicia ATE: CA ZIP: 94510

TEL: 707-751-3817 FAX: 707-751-3897 E-MAIL: dsolis@envamerica.com

CLIENT PROJECT NAME / NUMBER: TAB1401

SITE LOCATION:

PROJECT CONTACT: D. Solis

LABORATORY: Cal Science

SAMPLER(S): (SIGNATURE)

LOG ON: 14-09-2102

TURNAROUND TIME:
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____ / ____ / ____

SPECIAL INSTRUCTIONS:

10X Rule for Metals

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION / DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Please list tests required	Hydrocarbon Chain 8015M	VOC 8260B	CAM 17 Metals - 6010	Semi-VOC 8270
1	Bin-COMP-1	Bin	9-24	1300	S	1		x	x	x	x

Relinquished by: (Signature) M. Goff	Received by: (Signature) Tom O'Malley ECI	Date: 9/25/14	Time: 1505
Relinquished by: (Signature) Tom O'Malley TO 6-50 9/25/14 1730	Received by: (Signature) Wdsath ECI	Date: 9/26/14	Time: 0755
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

02/24/10 Revision

Return to Contents

GSO

WebShip > > > > >

800-322-5555 www.gso.com

2102

Ship From:
ALAN KEMP
CAL SCIENCE- CONCORD
5063 COMMERCIAL CIRCLE #H
CONCORD, CA 94520

Ship To:
SAMPLE RECEIVING
CEL
7440 LINCOLN WAY
GARDEN GROVE, CA 92841

COD:
$0.00

Reference:
ENV, BTS (ARCADIS), ERM

Delivery Instructions:

Signature Type:
SIGNATURE REQUIRED

Tracking #: 525726758

NPS

ORC

A

GARDEN GROVE

D92845A

29099714

Print Date : 09/25/14 15:23 PM

Package 1 of 1

Send Label To Printer ☑ Print All Edit Shipment Finish

LABEL INSTRUCTIONS:

Do not copy or reprint this label for additional shipments - each package must have a unique barcode.

STEP 1 - Use the "Send Label to Printer" button on this page to print the shipping label on a laser or inkjet printer.
STEP 2 - Fold this page in half.
STEP 3 - Securely attach this label to your package, do not cover the barcode.
STEP 4 - Request an on-call pickup for your package, if you do not have scheduled daily pickup service or Drop-off your package at the nearest GSO drop box. Locate nearest GSO dropbox locations using this link.

ADDITIONAL OPTIONS:

Send Label Via Email Create Return Label

TERMS AND CONDITIONS:

By giving us your shipment to deliver, you agree to all the service terms and conditions described in this section.
Our liability for loss or damage to any package is limited to your actual damages or $100 whichever is less, unless you pay for and declare a higher authorized value. If you declare a higher value and pay the additional charge, our liability will be the lesser of your declared value or the actual value of your loss or damage. In any event, we will not be liable for any damage, whether direct, incidental, special or consequential, in excess of the declared value of a shipment whether or not we had knowledge that such damage might be incurred including but not limited to loss of income or profit. We will not be liable for your acts or omissions, including but not limited to improper or insufficient packaging, securing, marking or addressing. Also, we will not be liable if you or the recipient violates any of the terms of our agreement. We will not be liable for loss, damage or delay caused by events we cannot control, including but not limited to acts of God, perils of the air, weather conditions, act of public enemies, war, strikes, or civil commotion. The highest declared value for our GSO Priority Letter or GSO Priority Package is $500. For other shipments the highest declared value is $10,000 unless your package contains items of "extraordinary value", in which case the highest declared value we allow is $500. Items of "extraordinary value" include, but or not limited to, artwork, jewelry, furs, precious metals, tickets, negotiable instruments and other items with intrinsic value.

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WORK ORDER #: 14-09-2102

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: ENV AMERICA DATE: 09/26/14

TEMPERATURE: Thermometer ID: SC1 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.1 °C - 0.3 °C (CF) = 2.8 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter **Checked by:** 426

CUSTODY SEALS INTACT:

☑ Cooler ☐_____ ☐ No (Not Intact) ☐ Not Present ☐ N/A **Checked by:** 426

☐ Sample ☐_____ ☐ No (Not Intact) ☑ Not Present **Checked by:** 619

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☐	☑	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation noted on COC or sample container	☐	☐	☑
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☐	☐	☑
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☑8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐_____

Aqueous: ☐VOA ☐VOA**h** ☐VOA**na$_2$** ☐125AGB ☐125AGB**h** ☐125AGB**p** ☐1AGB ☐1AGB**na$_2$** ☐1AGB**s**

☐500AGB ☐500AGJ ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☐1PB ☐1PB**na** ☐500PB

☐250PB ☐250PB**n** ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na$_2$** ☐_____ ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:**_____ **Labeled/Checked by:** 619

Container: **C:** Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelope **Reviewed by:** 3W

Preservative: **h:** HCL **n:** HNO_3 **na$_2$:**$Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** 3W

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Supplemental Report 1

Additional requested analyses are reported as a stand-alone report.

WORK ORDER NUMBER: 14-09-2102

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: ENV Environmental International, Inc.

Client Project Name: TAB1401

Attention: David Solis
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Approved for release on 10/10/2014 by:
Don Burley
Project Manager

ResultLink

Email your PM

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Contents

Client Project Name: TAB1401
Work Order Number: 14-09-2102

1 Work Order Narrative. 3

2 Sample Summary. 4

3 Client Sample Data. 5
3.1 EPA 6010B STLC ICP Metals (Aqueous). 5

4 Quality Control Sample Data. 6
4.1 MS/MSD. 6
4.2 LCS/LCSD. 7

5 Sample Analysis Summary. 8

6 Glossary of Terms and Qualifiers. 9

7 Chain-of-Custody/Sample Receipt Form. 10

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Work Order Narrative

Work Order: 14-09-2102 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 09/26/14. They were assigned to Work Order 14-09-2102.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

New York NELAP air certification does not certify for all reported methods and analytes, reference the accredited items here: http://www.calscience.com/PDF/New_York.pdf

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Return to Contents

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Sample Summary

Client:	ENV Environmental International, Inc.	Work Order:	14-09-2102
	1090 Adams Street, Suite D	Project Name:	TAB1401
	Benicia, CA 94510-2953	PO Number:	
		Date/Time Received:	09/26/14 07:55
		Number of Containers:	1
Attn:	David Solis		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
Bin-COMP-1	14-09-2102-1	09/24/14 13:00	1	Solid

Return to Contents

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Analytical Report

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Project: TAB1401

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: T22.11.5. AII
Method: EPA 6010B
Units: mg/L

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Bin-COMP-1	**14-09-2102-1-A**	**09/24/14 13:00**	**Solid**	**ICP 7300**	**10/06/14**	**10/09/14 00:13**	**141008LA4A**

Comment(s): - The analysis was performed on a STLC extract of the sample.

Parameter	Result	RL	DF	Qualifiers
Chromium	0.990	0.100	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**097-05-006-7496**	**N/A**	**Aqueous**	**ICP 7300**	**10/06/14**	**10/08/14 23:48**	**141008LA4A**

Parameter	Result	RL	DF	Qualifiers
Chromium	ND	0.100	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	T22.11.5. AII
		Method:	EPA 6010B
Project: TAB1401			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
14-10-0525-1	**Sample**	**Aqueous**	**ICP 7300**	**10/08/14**	**10/08/14 23:51**	**141008SA4**
14-10-0525-1	**Matrix Spike**	**Aqueous**	**ICP 7300**	**10/08/14**	**10/08/14 23:53**	**141008SA4**
14-10-0525-1	**Matrix Spike Duplicate**	**Aqueous**	**ICP 7300**	**10/08/14**	**10/08/14 23:54**	**141008SA4**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Chromium	ND	5.000	5.045	101	5.050	101	75-125	0	0-20	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	T22.11.5. AII
		Method:	EPA 6010B
Project: TAB1401			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
097-05-006-7496	**LCS**	**Aqueous**	**ICP 7300**	**10/06/14**	**10/08/14 23:50**	**141008LA4A**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Chromium	5.000	4.958	99	80-120	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Sample Analysis Summary Report

Work Order: 14-09-2102 Page 1 of 1

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 6010B	T22.11.5. AII	469	ICP 7300	1

Return to Contents

Location 1: 7440 Lincoln Way, Garden Grove, CA 92841

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Glossary of Terms and Qualifiers

Work Order: 14-09-2102 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

Return to Contents

ENV
1090 Adams St., Ste D
BENICIA, CA 94510
TEL: (707) 751-3817 . FAX: (707) 751-3897

CHAIN OF CUSTODY RECORD

DATE: 09/25/14

PAGE: 1 OF 1

LABORATORY CLIENT: ENV America, Inc.

ADDRESS: 1090 Adams St., Ste D

CITY: Benicia ATE: CA ZIP: 94510

TEL: 707-751-3817 FAX: 707-751-3897 E-MAIL: dsolis@envamerica.com

CLIENT PROJECT NAME / NUMBER: TAB1401

SITE LOCATION:

PROJECT CONTACT: D. Solis

LABORATORY: Cal Science

SAMPLER(S): (SIGNATURE)

LOG ON: 14-09-2102

TURNAROUND TIME:
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____ / ____ / ____

SPECIAL INSTRUCTIONS:

10X Rule for Metals

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION / DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Please list tests required	Hydrocarbon Chain 8015M	VOC 8260B	CAM 17 Metals - 6010	Semi-VOC 8270
1	Bin-COMP-1	Bin	9-24	1300	S	1		x	x	x	x

Relinquished by: (Signature) M. Goff	Received by: (Signature) Tom O'Malley ECI	Date: 9/25/14	Time: 1505
Relinquished by: (Signature) Tom O'Malley TO 6-50 9/25/14 1730	Received by: (Signature) Wdsath ECI	Date: 9/26/14	Time: 0755
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

02/24/10 Revision

Return to Contents

GSO

< WebShip > > > > >

800-322-5555 www.gso.com

2102

Ship From:
ALAN KEMP
CAL SCIENCE- CONCORD
5063 COMMERCIAL CIRCLE #H
CONCORD, CA 94520

Ship To:
SAMPLE RECEIVING
CEL
7440 LINCOLN WAY
GARDEN GROVE, CA 92841

COD:
$0.00

Reference:
ENV, BTS (ARCADIS), ERM

Delivery Instructions:

Signature Type:
SIGNATURE REQUIRED

Tracking #: 525726758

NPS

ORC

A

GARDEN GROVE

D92845A

29099714

Print Date : 09/25/14 15:23 PM

Package 1 of 1

Send Label To Printer | ☑ Print All | Edit Shipment | Finish

LABEL INSTRUCTIONS:

Do not copy or reprint this label for additional shipments - each package must have a unique barcode.

STEP 1 - Use the "Send Label to Printer" button on this page to print the shipping label on a laser or inkjet printer.
STEP 2 - Fold this page in half.
STEP 3 - Securely attach this label to your package, do not cover the barcode.
STEP 4 - Request an on-call pickup for your package, if you do not have scheduled daily pickup service or Drop-off your package at the nearest GSO drop box. Locate nearest GSO dropbox locations using this link.

ADDITIONAL OPTIONS:

Send Label Via Email | Create Return Label

TERMS AND CONDITIONS:

By giving us your shipment to deliver, you agree to all the service terms and conditions described in this section.
Our liability for loss or damage to any package is limited to your actual damages or $100 whichever is less, unless you pay for and declare a higher authorized value. If you declare a higher value and pay the additional charge, our liability will be the lesser of your declared value or the actual value of your loss or damage. In any event, we will not be liable for any damage, whether direct, incidental, special or consequential, in excess of the declared value of a shipment whether or not we had knowledge that such damage might be incurred including but not limited to loss of income or profit. We will not be liable for your acts or omissions, including but not limited to improper or insufficient packaging, securing, marking or addressing. Also, we will not be liable if you or the recipient violates any of the terms of our agreement. We will not be liable for loss, damage or delay caused by events we cannot control, including but not limited to acts of God, perils of the air, weather conditions, act of public enemies, war, strikes, or civil commotion. The highest declared value for our GSO Priority Letter or GSO Priority Package is $500. For other shipments the highest declared value is $10,000 unless your package contains items of "extraordinary value", in which case the highest declared value we allow is $500. Items of "extraordinary value" include, but or not limited to, artwork, jewelry, furs, precious metals, tickets, negotiable instruments and other items with intrinsic value.

eurofins | Calscience

WORK ORDER #: 14-09-2102

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: ENV AMERICA

DATE: 09/26/14

TEMPERATURE: Thermometer ID: SC1 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.1 °C - 0.3 °C (CF) = 2.8 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter **Checked by:** 426

CUSTODY SEALS INTACT:

☑ Cooler ☐_____ ☐ No (Not Intact) ☐ Not Present ☐ N/A **Checked by:** 426

☐ Sample ☐_____ ☐ No (Not Intact) ☑ Not Present **Checked by:** 619

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☐	☑	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation noted on COC or sample container	☐	☐	☑
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☐	☐	☑
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☑8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐_____

Aqueous: ☐VOA ☐VOA**h** ☐VOA**na$_2$** ☐125AGB ☐125AGB**h** ☐125AGB**p** ☐1AGB ☐1AGB**na$_2$** ☐1AGB**s** ☐500AGB ☐500AGJ ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☐1PB ☐1PB**na** ☐500PB ☐250PB ☐250PB**n** ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na$_2$** ☐_____ ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:**_____ **Labeled/Checked by:** 619

Container: **C:** Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelope **Reviewed by:** 3W

Preservative: **h:** HCL **n:** HNO_3 **na$_2$:**$Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** 3W

Return to Contents


Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 265476
ANALYTICAL REPORT

ENV America Incorporated	Project : TAB1501
1090 Adams St.	Location : W. Sacramento
Benicia, CA 94510	Level : II

Sample ID	Lab ID
BC-1	265476-001

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Mikelle Chong Date: 03/30/2015

Mikelle Chong
Project Manager
mikelle.chong@ctberk.com

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**265476**
Client:	**ENV America Incorporated**
Project:	**TAB1501**
Location:	**W. Sacramento**
Request Date:	**03/20/15**
Samples Received:	**03/20/15**

This data package contains sample and QC results for one soil sample, requested for the above referenced project on 03/20/15. The sample was received on ice and intact.

TPH-Purgeables and/or BTXE by GC (EPA 8015B):
No analytical problems were encountered.

TPH-Extractables by GC (EPA 8015B):
Low recoveries were observed for diesel C10-C24 in the MS/MSD of BC-1 (lab # 265476-001); the LCS was within limits, and the associated RPD was within limits. No other analytical problems were encountered.

Volatile Organics by GC/MS (EPA 8260B):
No analytical problems were encountered.

Metals (EPA 6010B and EPA 7471A):
No analytical problems were encountered.

ENV
1090 Adams St., Ste D
BENICIA, CA 94510
TEL: (707) 751-3817 . FAX: (707) 751-3897

265476

CHAIN OF CUSTODY RECORD

DATE: 03/20/15

PAGE: 1 OF 1

LABORATORY CLIENT: ENV America, Inc.			CLIENT PROJECT NAME / NUMBER: TAB1501
ADDRESS: 1090 Adams St., Ste D			SITE LOCATION: W. Sacramento
CITY: Benicia	ATE: CA	ZIP: 94510	PROJECT CONTACT: D. Solis
TEL: 707-751-3817	FAX: 707-751-3897	E-MAIL: dsolis@envamerica.com	LABORATORY: Curtis & Tompkins
			SAMPLER(S): (SIGNATURE)
			LAB USE ONLY ☐☐-☐☐☐☐

TURNAROUND TIME:
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:
X10 RULE FOR METALS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION / DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Please list tests required: Hydrocarbon Chain 8015	VOC 8260B	CAM 17 Metals 6010B
	BC-1	Bin	3/18/2015	11:30 AM	S	1	x	x	x

Relinquished by: (Signature) N. [illegible]	Received by: (Signature) Pat Hamilton	Date: 3/20/15	Time: 1:08
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

02/24/10 Revision

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 265476 Date Received 3/20/15 Number of coolers 1
Client ENV America, Inc. Project TRC 1501

Date Opened 3/20 By (print) SC (sign)
Date Logged in 3/20 By (print) BL (sign)

1. Did cooler come with a shipping slip (airbill, etc) YES (NO)
   Shipping info
2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO
   How many Name Date
2B. Were custody seals intact upon arrival? YES NO N/A
3. Were custody papers dry and intact when received? (YES) NO
4. Were custody papers filled out properly (ink, signed, etc)? (YES) NO
5. Is the project identifiable from custody papers? (If so fill out top of form) (YES) NO
6. Indicate the packing in cooler: (if other, describe)

☐ Bubble Wrap ☐ Foam blocks ☐ Bags ☒ None
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☒ Wet ☐ Blue/Gel ☐ None Temp(°C) 5.7°

☐ Samples Received on ice & cold without a temperature blank; temp. taken with IR gun

☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? YES (NO)
   If YES, what time were they transferred to freezer?
9. Did all bottles arrive unbroken/unopened? (YES) NO
10. Are there any missing / extra samples? YES (NO)
11. Are samples in the appropriate containers for indicated tests? (YES) NO
12. Are sample labels present, in good condition and complete? (YES) NO
13. Do the sample labels agree with custody papers? (YES) NO
14. Was sufficient amount of sample sent for tests requested? (YES) NO
15. Are the samples appropriately preserved? YES NO (N/A)
16. Did you check preservatives for all bottles for each sample? YES NO (N/A)
17. Did you document your preservative check? YES NO (N/A)
18. Did you change the hold time in LIMS for unpreserved VOAs? YES NO (N/A)
19. Did you change the hold time in LIMS for preserved terracores? YES NO (N/A)
20. Are bubbles > 6mm absent in VOA samples? YES NO (N/A)
21. Was the client contacted concerning this sample delivery? YES (NO)
   If YES, Who was called? By Date:

COMMENTS

Rev 10, 9/12

Curtis & Tompkins, Ltd.

Detections Summary for 265476

Results for any subcontracted analyses are not included in this summary.

Client : ENV America Incorporated
Project : TAB1501
Location : W. Sacramento

Client Sample ID : BC-1 Laboratory Sample ID : 265476-001

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Diesel C10-C24	190	Y	1.0	mg/Kg	As Recd	1.000	EPA 8015B	EPA 3550B
Motor Oil C24-C36	180		5.0	mg/Kg	As Recd	1.000	EPA 8015B	EPA 3550B
Hydraulic Fluid, C10-40	310		5.0	mg/Kg	As Recd	1.000	EPA 8015B	EPA 3550B
Arsenic	7.3		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Barium	72		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Beryllium	0.50		0.097	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Cadmium	0.94		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Chromium	26		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Cobalt	6.4		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Copper	9.0		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Lead	9.8		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Mercury	0.041		0.018	mg/Kg	As Recd	1.000	EPA 7471A	METHOD
Molybdenum	0.35		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Nickel	11		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Vanadium	46		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Zinc	74		0.97	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B

Y = Sample exhibits chromatographic pattern which does not resemble standard

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8015B
Field ID:	BC-1	Diln Fac:	1.000
Matrix:	Soil	Batch#:	221673
Units:	mg/Kg	Sampled:	03/18/15
Basis:	as received	Received:	03/20/15

Type: SAMPLE Analyzed: 03/26/15
Lab ID: 265476-001

Analyte	Result	RL
Gasoline C7-C12	ND	1.1

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	97	78-138

Type: BLANK Analyzed: 03/25/15
Lab ID: QC782046

Analyte	Result	RL
Gasoline C7-C12	ND	0.20

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	98	78-138

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC782045	Batch#:	221673
Matrix:	Soil	Analyzed:	03/25/15
Units:	mg/Kg		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1.000	0.9397	94	80-121

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	104	78-138

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Diln Fac:	1.000
MSS Lab ID:	265500-005	Batch#:	221673
Matrix:	Soil	Sampled:	03/20/15
Units:	mg/Kg	Received:	03/20/15
Basis:	as received	Analyzed:	03/26/15

Type: MS Lab ID: QC782047

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	0.1046	10.20	6.830	66	50-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	108	78-138

Type: MSD Lab ID: QC782048

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	10.64	6.689	62	50-120	6	31

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	119	78-138

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 3550B
Project#:	TAB1501	Analysis:	EPA 8015B
Field ID:	BC-1	Batch#:	221632
Matrix:	Soil	Sampled:	03/18/15
Units:	mg/Kg	Received:	03/20/15
Basis:	as received	Prepared:	03/24/15
Diln Fac:	1.000	Analyzed:	03/25/15

Type: SAMPLE Lab ID: 265476-001

Analyte	Result	RL
Diesel C10-C24	190 Y	1.0
Motor Oil C24-C36	180	5.0
Hydraulic Fluid, C10-40	310	5.0

Surrogate	%REC	Limits
o-Terphenyl	99	59-140

Type: BLANK Lab ID: QC781888

Analyte	Result	RL
Diesel C10-C24	ND	1.0
Motor Oil C24-C36	ND	5.0
Hydraulic Fluid, C10-40	ND	5.0

Surrogate	%REC	Limits
o-Terphenyl	100	59-140

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 3550B
Project#:	TAB1501	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC781889	Batch#:	221632
Matrix:	Soil	Prepared:	03/24/15
Units:	mg/Kg	Analyzed:	03/25/15

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	50.44	44.18	88	58-137

Surrogate	%REC	Limits
o-Terphenyl	88	59-140

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 3550B
Project#:	TAB1501	Analysis:	EPA 8015B
Field ID:	BC-1	Batch#:	221632
MSS Lab ID:	265476-001	Sampled:	03/18/15
Matrix:	Soil	Received:	03/20/15
Units:	mg/Kg	Prepared:	03/24/15
Basis:	as received	Analyzed:	03/25/15
Diln Fac:	1.000		

Type: MS Lab ID: QC781890

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	193.5	50.27	190.7	-6 *	46-154

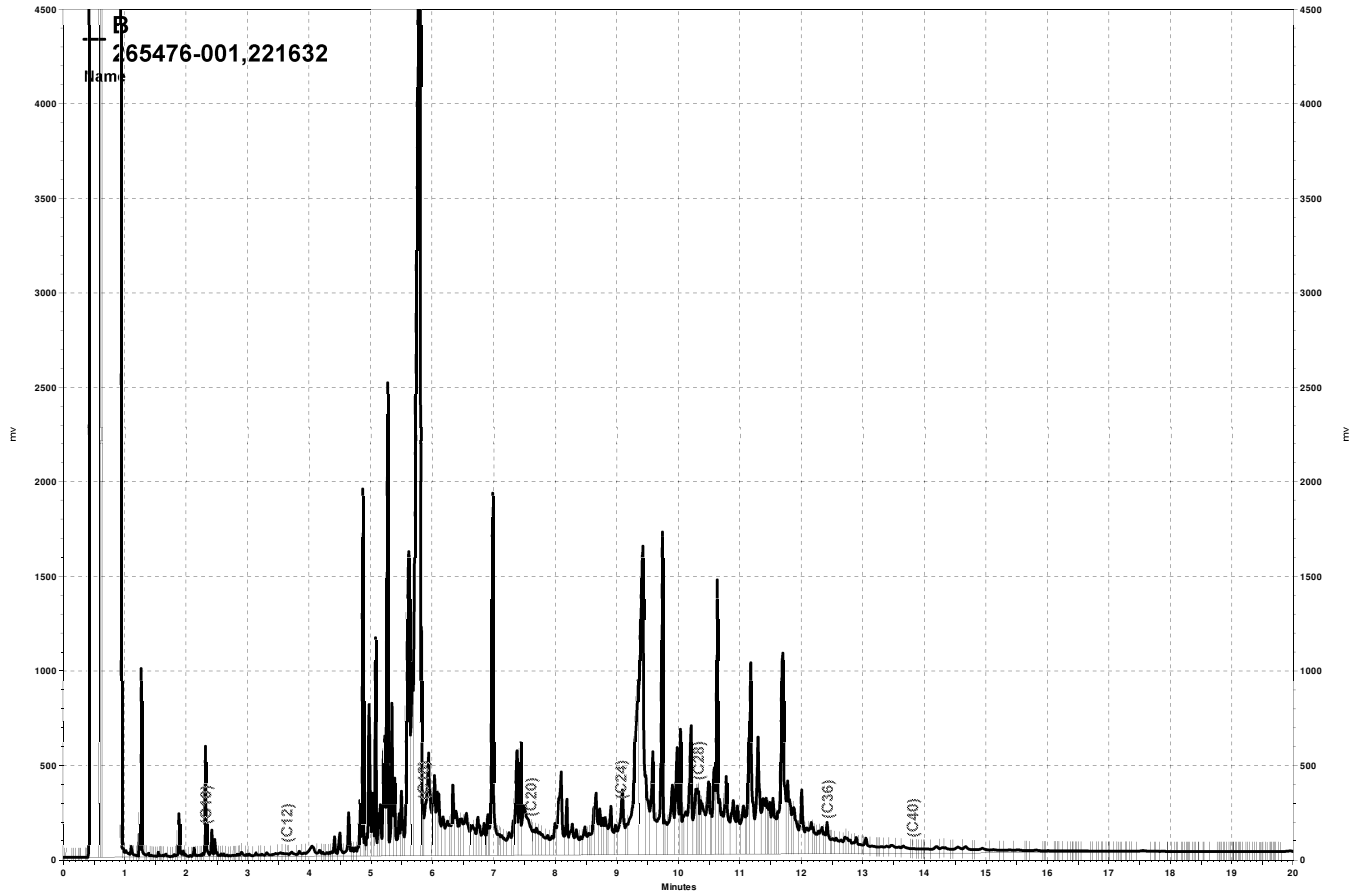
Surrogate	%REC	Limits
o-Terphenyl	127	59-140

Type: MSD Lab ID: QC781891

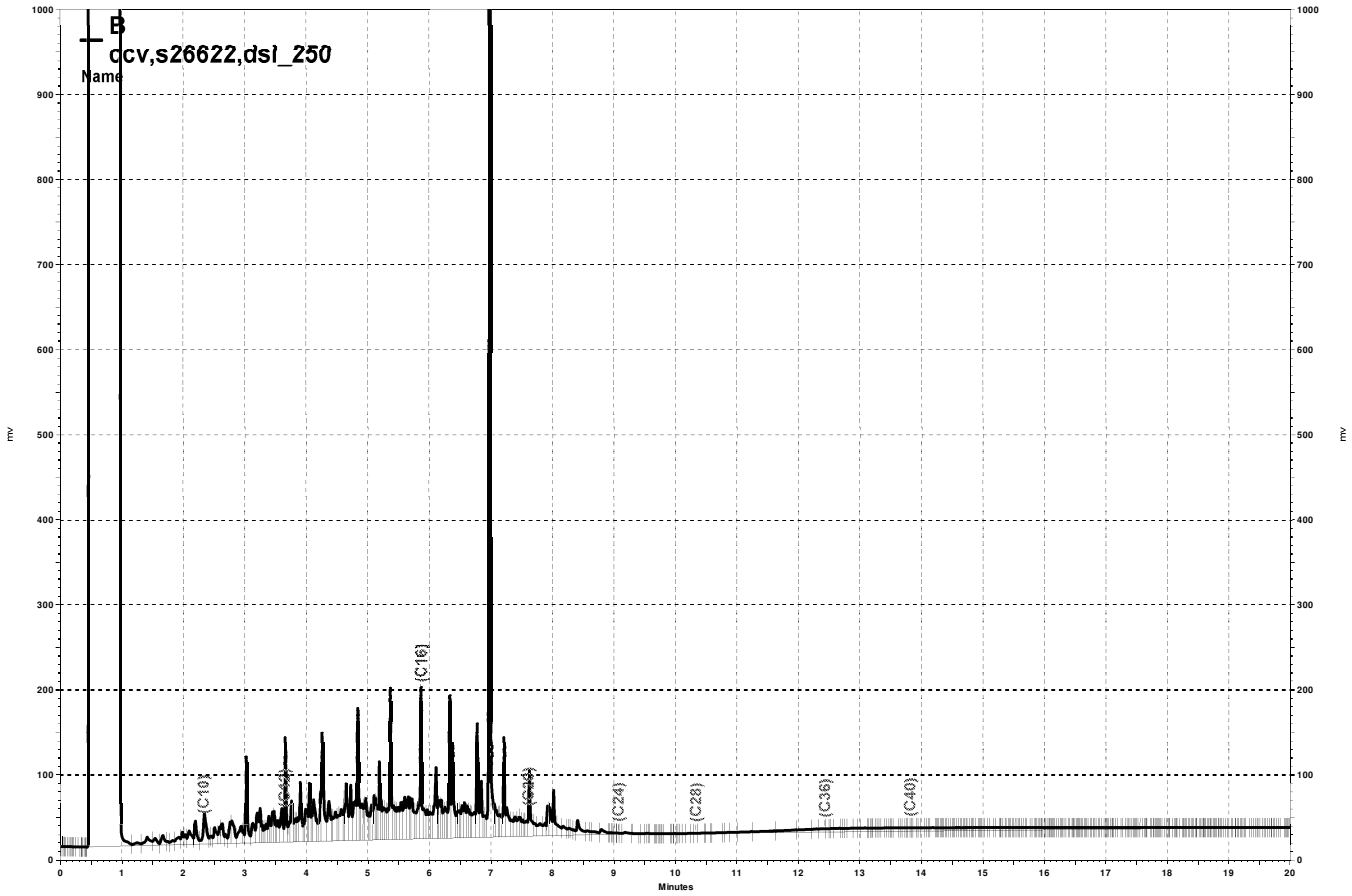
Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	50.43	182.2	-22 *	46-154	5	50

Surrogate	%REC	Limits
o-Terphenyl	82	59-140

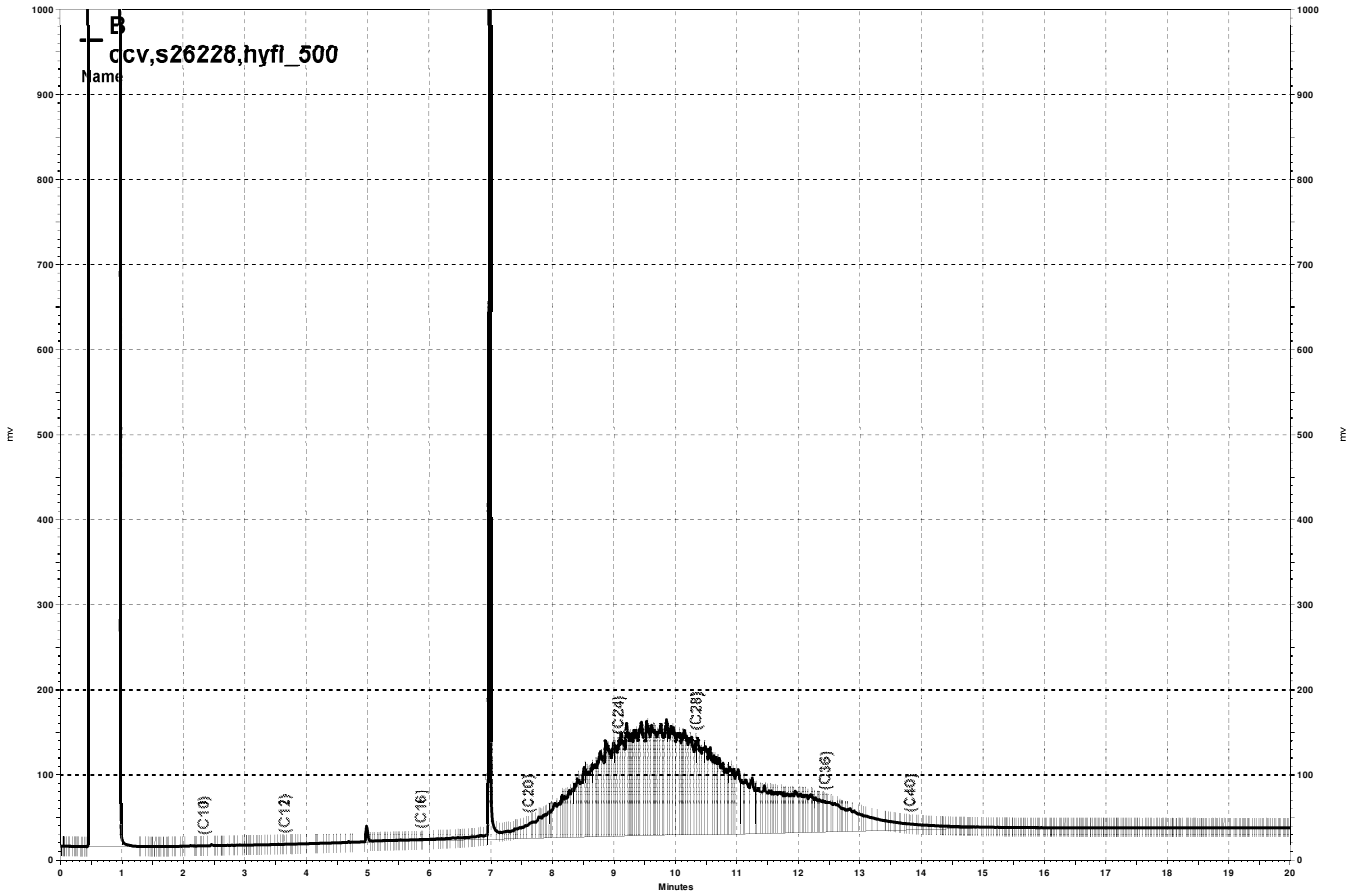
*= Value outside of QC limits; see narrative
RPD= Relative Percent Difference



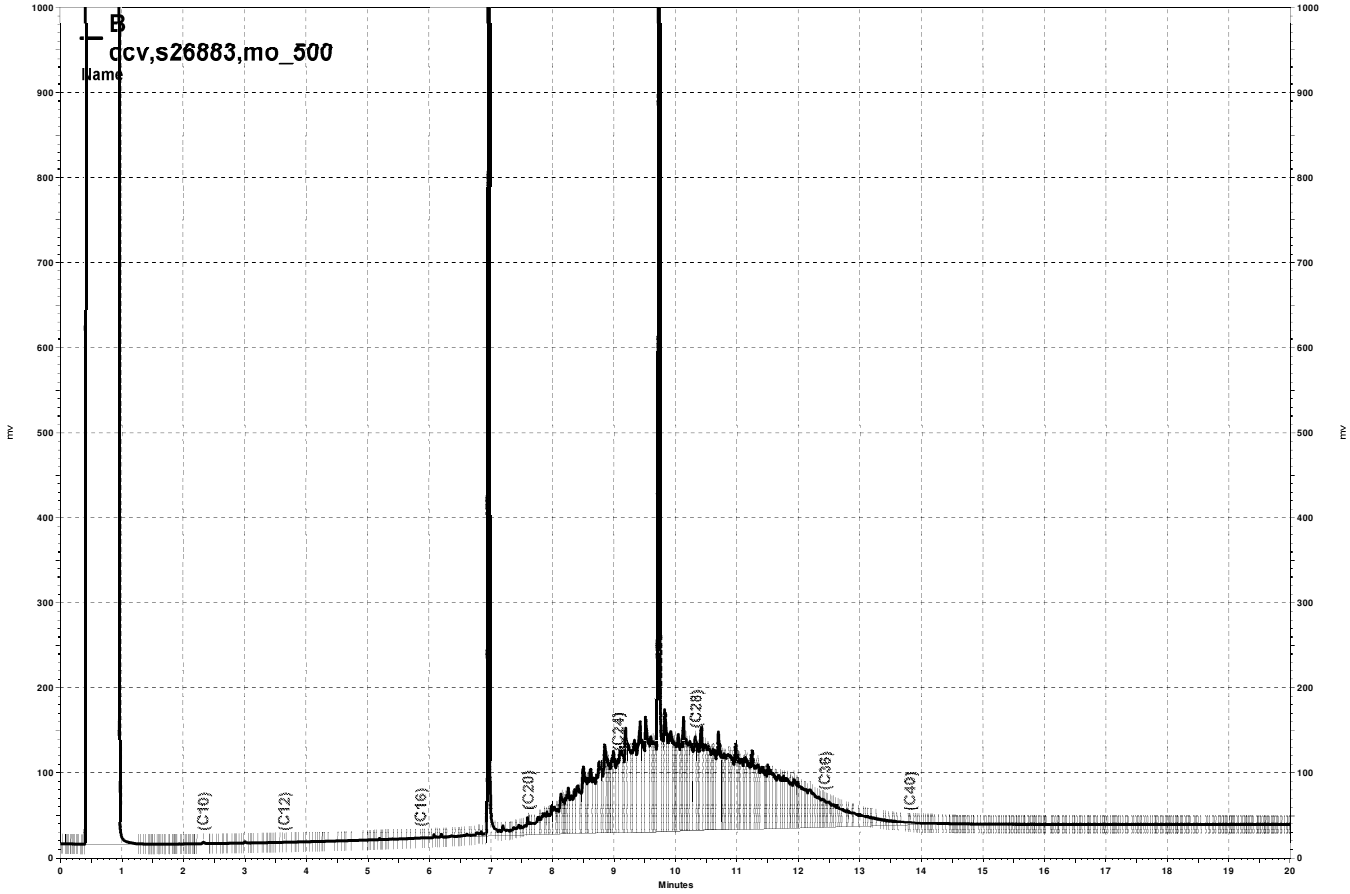
\\Lims\gdrive\ezchrom\Projects\GC15B\Data\083b049, B



\\Lims\gdrive\ezchrom\Projects\GC15B\Data\083b038, B



\\Lims\gdrive\ezchrom\Projects\GC15B\Data\083b039, B



\\Lims\gdrive\ezchrom\Projects\GC15B\Data\083b037, B

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8260B
Field ID:	BC-1	Diln Fac:	0.9980
Lab ID:	265476-001	Batch#:	221525
Matrix:	Soil	Sampled:	03/18/15
Units:	ug/Kg	Received:	03/20/15
Basis:	as received	Analyzed:	03/20/15

Analyte	Result	RL
Freon 12	ND	10
Chloromethane	ND	10
Vinyl Chloride	ND	10
Bromomethane	ND	10
Chloroethane	ND	10
Trichlorofluoromethane	ND	5.0
Acetone	ND	20
Freon 113	ND	5.0
1,1-Dichloroethene	ND	5.0
Methylene Chloride	ND	20
Carbon Disulfide	ND	5.0
MTBE	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Vinyl Acetate	ND	50
1,1-Dichloroethane	ND	5.0
2-Butanone	ND	10
cis-1,2-Dichloroethene	ND	5.0
2,2-Dichloropropane	ND	5.0
Chloroform	ND	5.0
Bromochloromethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
1,1-Dichloropropene	ND	5.0
Carbon Tetrachloride	ND	5.0
1,2-Dichloroethane	ND	5.0
Benzene	ND	5.0
Trichloroethene	ND	5.0
1,2-Dichloropropane	ND	5.0
Bromodichloromethane	ND	5.0
Dibromomethane	ND	5.0
4-Methyl-2-Pentanone	ND	10
cis-1,3-Dichloropropene	ND	5.0
Toluene	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
2-Hexanone	ND	10
1,3-Dichloropropane	ND	5.0
Tetrachloroethene	ND	5.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8260B
Field ID:	BC-1	Diln Fac:	0.9980
Lab ID:	265476-001	Batch#:	221525
Matrix:	Soil	Sampled:	03/18/15
Units:	ug/Kg	Received:	03/20/15
Basis:	as received	Analyzed:	03/20/15

Analyte	Result	RL
Dibromochloromethane	ND	5.0
1,2-Dibromoethane	ND	5.0
Chlorobenzene	ND	5.0
1,1,1,2-Tetrachloroethane	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0
Styrene	ND	5.0
Bromoform	ND	5.0
Isopropylbenzene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
1,2,3-Trichloropropane	ND	5.0
Propylbenzene	ND	5.0
Bromobenzene	ND	5.0
1,3,5-Trimethylbenzene	ND	5.0
2-Chlorotoluene	ND	5.0
4-Chlorotoluene	ND	5.0
tert-Butylbenzene	ND	5.0
1,2,4-Trimethylbenzene	ND	5.0
sec-Butylbenzene	ND	5.0
para-Isopropyl Toluene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
n-Butylbenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,2-Dibromo-3-Chloropropane	ND	5.0
1,2,4-Trichlorobenzene	ND	5.0
Hexachlorobutadiene	ND	5.0
Naphthalene	ND	5.0
1,2,3-Trichlorobenzene	ND	5.0

Surrogate	%REC	Limits
Dibromofluoromethane	117	78-134
1,2-Dichloroethane-d4	138	80-138
Toluene-d8	97	80-120
Bromofluorobenzene	106	78-123

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8260B
Matrix:	Soil	Batch#:	221525
Units:	ug/Kg	Analyzed:	03/20/15
Diln Fac:	1.000		

Type: BS Lab ID: QC781469

Analyte	Spiked	Result	%REC	Limits
1,1-Dichloroethene	20.00	20.59	103	70-134
Benzene	20.00	22.16	111	80-123
Trichloroethene	20.00	21.42	107	80-128
Toluene	20.00	22.70	114	80-120
Chlorobenzene	20.00	23.40	117	80-123

Surrogate	%REC	Limits
Dibromofluoromethane	93	78-134
1,2-Dichloroethane-d4	90	80-138
Toluene-d8	98	80-120
Bromofluorobenzene	90	78-123

Type: BSD Lab ID: QC781470

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
1,1-Dichloroethene	20.00	19.64	98	70-134	5	22
Benzene	20.00	21.99	110	80-123	1	21
Trichloroethene	20.00	21.58	108	80-128	1	23
Toluene	20.00	21.41	107	80-120	6	20
Chlorobenzene	20.00	22.60	113	80-123	3	20

Surrogate	%REC	Limits
Dibromofluoromethane	94	78-134
1,2-Dichloroethane-d4	94	80-138
Toluene-d8	95	80-120
Bromofluorobenzene	88	78-123

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC781471	Batch#:	221525
Matrix:	Soil	Analyzed:	03/20/15
Units:	ug/Kg		

Analyte	Result	RL
Freon 12	ND	10
Chloromethane	ND	10
Vinyl Chloride	ND	10
Bromomethane	ND	10
Chloroethane	ND	10
Trichlorofluoromethane	ND	5.0
Acetone	ND	20
Freon 113	ND	5.0
1,1-Dichloroethene	ND	5.0
Methylene Chloride	ND	20
Carbon Disulfide	ND	5.0
MTBE	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Vinyl Acetate	ND	50
1,1-Dichloroethane	ND	5.0
2-Butanone	ND	10
cis-1,2-Dichloroethene	ND	5.0
2,2-Dichloropropane	ND	5.0
Chloroform	ND	5.0
Bromochloromethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
1,1-Dichloropropene	ND	5.0
Carbon Tetrachloride	ND	5.0
1,2-Dichloroethane	ND	5.0
Benzene	ND	5.0
Trichloroethene	ND	5.0
1,2-Dichloropropane	ND	5.0
Bromodichloromethane	ND	5.0
Dibromomethane	ND	5.0
4-Methyl-2-Pentanone	ND	10
cis-1,3-Dichloropropene	ND	5.0
Toluene	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
2-Hexanone	ND	10
1,3-Dichloropropane	ND	5.0
Tetrachloroethene	ND	5.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC781471	Batch#:	221525
Matrix:	Soil	Analyzed:	03/20/15
Units:	ug/Kg		

Analyte	Result	RL
Dibromochloromethane	ND	5.0
1,2-Dibromoethane	ND	5.0
Chlorobenzene	ND	5.0
1,1,1,2-Tetrachloroethane	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0
Styrene	ND	5.0
Bromoform	ND	5.0
Isopropylbenzene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
1,2,3-Trichloropropane	ND	5.0
Propylbenzene	ND	5.0
Bromobenzene	ND	5.0
1,3,5-Trimethylbenzene	ND	5.0
2-Chlorotoluene	ND	5.0
4-Chlorotoluene	ND	5.0
tert-Butylbenzene	ND	5.0
1,2,4-Trimethylbenzene	ND	5.0
sec-Butylbenzene	ND	5.0
para-Isopropyl Toluene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
n-Butylbenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,2-Dibromo-3-Chloropropane	ND	5.0
1,2,4-Trichlorobenzene	ND	5.0
Hexachlorobutadiene	ND	5.0
Naphthalene	ND	5.0
1,2,3-Trichlorobenzene	ND	5.0

Surrogate	%REC	Limits
Dibromofluoromethane	95	78-134
1,2-Dichloroethane-d4	99	80-138
Toluene-d8	100	80-120
Bromofluorobenzene	98	78-123

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8260B
Field ID:	ZZZZZZZZZZ	Batch#:	221525
MSS Lab ID:	265465-002	Sampled:	03/20/15
Matrix:	Soil	Received:	03/20/15
Units:	ug/Kg	Analyzed:	03/21/15
Basis:	as received		

Type: MS Diln Fac: 0.9398
Lab ID: QC781551

Analyte	MSS Result	Spiked	Result	%REC	Limits
1,1-Dichloroethene	<0.9230	46.99	42.79	91	56-133
Benzene	<0.8863	46.99	42.14	90	57-120
Trichloroethene	<0.8204	46.99	39.91	85	49-145
Toluene	<0.6987	46.99	36.61	78	51-120
Chlorobenzene	<0.6740	46.99	38.55	82	47-120

Surrogate	%REC	Limits
Dibromofluoromethane	105	78-134
1,2-Dichloroethane-d4	106	80-138
Toluene-d8	90	80-120
Bromofluorobenzene	84	78-123

Type: MSD Diln Fac: 0.9208
Lab ID: QC781552

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
1,1-Dichloroethene	46.04	41.82	91	56-133	0	46
Benzene	46.04	39.04	85	57-120	6	44
Trichloroethene	46.04	37.18	81	49-145	5	46
Toluene	46.04	34.74	75	51-120	3	47
Chlorobenzene	46.04	35.99	78	47-120	5	50

Surrogate	%REC	Limits
Dibromofluoromethane	98	78-134
1,2-Dichloroethane-d4	99	80-138
Toluene-d8	91	80-120
Bromofluorobenzene	86	78-123

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

California Title 22 Metals

Lab #:	265476	Project#:	TAB1501
Client:	ENV America Incorporated	Location:	W. Sacramento
Field ID:	BC-1	Basis:	as received
Lab ID:	265476-001	Diln Fac:	1.000
Matrix:	Soil	Sampled:	03/18/15
Units:	mg/Kg	Received:	03/20/15

Analyte	Result	RL	Batch#	Prepared	Analyzed	Prep	Analysis
Antimony	ND	0.49	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Arsenic	7.3	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Barium	72	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Beryllium	0.50	0.097	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Cadmium	0.94	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Chromium	26	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Cobalt	6.4	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Copper	9.0	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Lead	9.8	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Mercury	0.041	0.018	221718	03/27/15	03/27/15	METHOD	EPA 7471A
Molybdenum	0.35	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Nickel	11	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Selenium	ND	0.49	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Silver	ND	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Thallium	ND	0.49	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Vanadium	46	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Zinc	74	0.97	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

California Title 22 Metals			
Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 3050B
Project#:	TAB1501	Analysis:	EPA 6010B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC781912	Batch#:	221639
Matrix:	Soil	Prepared:	03/25/15
Units:	mg/Kg	Analyzed:	03/25/15

Analyte	Result	RL
Antimony	ND	0.50
Arsenic	ND	0.25
Barium	ND	0.25
Beryllium	ND	0.10
Cadmium	ND	0.25
Chromium	ND	0.25
Cobalt	ND	0.25
Copper	ND	0.25
Lead	ND	0.25
Molybdenum	ND	0.25
Nickel	ND	0.25
Selenium	ND	0.50
Silver	ND	0.25
Thallium	ND	0.50
Vanadium	ND	0.25
Zinc	ND	1.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

California Title 22 Metals

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 3050B
Project#:	TAB1501	Analysis:	EPA 6010B
Matrix:	Soil	Batch#:	221639
Units:	mg/Kg	Prepared:	03/25/15
Diln Fac:	5.000	Analyzed:	03/25/15

Type: BS Lab ID: QC781913

Analyte	Spiked	Result	%REC	Limits
Antimony	50.00	47.85	96	80-120
Arsenic	50.00	49.62	99	80-120
Barium	50.00	50.00	100	80-120
Beryllium	50.00	49.81	100	80-120
Cadmium	50.00	51.95	104	80-120
Chromium	50.00	49.74	99	80-120
Cobalt	50.00	46.85	94	80-120
Copper	50.00	48.37	97	80-120
Lead	50.00	47.43	95	80-120
Molybdenum	50.00	50.18	100	80-120
Nickel	50.00	47.82	96	80-120
Selenium	50.00	49.20	98	80-120
Silver	50.00	48.14	96	80-120
Thallium	50.00	49.88	100	80-120
Vanadium	50.00	51.20	102	80-120
Zinc	50.00	49.64	99	80-120

Type: BSD Lab ID: QC781914

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Antimony	50.00	48.47	97	80-120	1	20
Arsenic	50.00	51.39	103	80-120	4	20
Barium	50.00	49.86	100	80-120	0	20
Beryllium	50.00	51.01	102	80-120	2	20
Cadmium	50.00	52.11	104	80-120	0	20
Chromium	50.00	49.81	100	80-120	0	20
Cobalt	50.00	47.44	95	80-120	1	20
Copper	50.00	48.23	96	80-120	0	20
Lead	50.00	48.13	96	80-120	1	20
Molybdenum	50.00	50.82	102	80-120	1	20
Nickel	50.00	48.51	97	80-120	1	20
Selenium	50.00	52.60	105	80-120	7	20
Silver	50.00	47.83	96	80-120	1	20
Thallium	50.00	49.50	99	80-120	1	20
Vanadium	50.00	51.34	103	80-120	0	20
Zinc	50.00	50.83	102	80-120	2	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

California Title 22 Metals

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 3050B
Project#:	TAB1501	Analysis:	EPA 6010B
Field ID:	BC-1	Batch#:	221639
MSS Lab ID:	265476-001	Sampled:	03/18/15
Matrix:	Soil	Received:	03/20/15
Units:	mg/Kg	Prepared:	03/25/15
Basis:	as received	Analyzed:	03/25/15
Diln Fac:	5.000		

Type: MS Lab ID: QC781915

Analyte	MSS Result	Spiked	Result	%REC	Limits
Antimony	0.3872	51.55	9.802	18	15-120
Arsenic	7.340	51.55	55.40	93	69-120
Barium	71.87	51.55	127.9	109	35-154
Beryllium	0.4974	51.55	49.91	96	75-120
Cadmium	0.9442	51.55	50.02	95	71-120
Chromium	25.71	51.55	79.15	104	57-133
Cobalt	6.437	51.55	51.99	88	56-125
Copper	9.006	51.55	56.72	93	54-144
Lead	9.764	51.55	55.61	89	53-125
Molybdenum	0.3461	51.55	44.59	86	66-120
Nickel	10.73	51.55	59.62	95	44-141
Selenium	<0.1551	51.55	44.13	86	61-120
Silver	0.1724	51.55	47.62	92	69-120
Thallium	<0.1363	51.55	47.57	92	59-120
Vanadium	45.53	51.55	100.6	107	52-144
Zinc	73.97	51.55	131.8	112	45-145

Type: MSD Lab ID: QC781916

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Antimony	49.50	9.700	19	15-120	3	41
Arsenic	49.50	53.89	94	69-120	1	35
Barium	49.50	119.4	96	35-154	5	36
Beryllium	49.50	47.90	96	75-120	0	20
Cadmium	49.50	48.20	95	71-120	0	25
Chromium	49.50	72.91	95	57-133	6	33
Cobalt	49.50	50.21	88	56-125	0	36
Copper	49.50	54.47	92	54-144	1	38
Lead	49.50	52.98	87	53-125	1	42
Molybdenum	49.50	42.70	86	66-120	0	20
Nickel	49.50	56.61	93	44-141	2	39
Selenium	49.50	43.74	88	61-120	3	33
Silver	49.50	45.23	91	69-120	1	22
Thallium	49.50	45.67	92	59-120	0	27
Vanadium	49.50	93.97	98	52-144	5	29
Zinc	49.50	123.4	100	45-145	5	39

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

California Title 22 Metals			
Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	METHOD
Project#:	TAB1501	Analysis:	EPA 7471A
Analyte:	Mercury	Diln Fac:	1.000
Type:	BLANK	Batch#:	221718
Lab ID:	QC782212	Prepared:	03/27/15
Matrix:	Soil	Analyzed:	03/27/15
Units:	mg/Kg		

Result	RL
ND	0.017

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

California Title 22 Metals

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	METHOD
Project#:	TAB1501	Analysis:	EPA 7471A
Analyte:	Mercury	Batch#:	221718
Matrix:	Soil	Prepared:	03/27/15
Units:	mg/Kg	Analyzed:	03/27/15
Diln Fac:	1.000		

Type	Lab ID	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC782213	0.2083	0.2313	111	80-120		
BSD	QC782214	0.2083	0.2163	104	80-120	7	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

California Title 22 Metals

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	METHOD
Project#:	TAB1501	Analysis:	EPA 7471A
Analyte:	Mercury	Diln Fac:	1.000
Field ID:	BC-1	Batch#:	221718
MSS Lab ID:	265476-001	Sampled:	03/18/15
Matrix:	Soil	Received:	03/20/15
Units:	mg/Kg	Prepared:	03/27/15
Basis:	as received	Analyzed:	03/27/15

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC782215	0.04125	0.2273	0.2671	99	69-142		
MSD	QC782216		0.1953	0.2355	99	69-142	0	36

RPD= Relative Percent Difference

Please print or type.
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number: N/A	2. Page 1 of: 1	3. Emergency Response Phone: 707-751-3817	4. Waste Tracking Number: NH-TAB1401110414-003

GENERATOR

5. Generator's Name and Mailing Address
Taber Drilling
536 Galveston St.
West Sacramento, CA 95691
Generator's Phone: (919) 952-8546

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: ENV Environmental International, Inc.
U.S. EPA ID Number: CAR000247189

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Potrero Hills Landfill
3675 Potrero Hills Lane
Suisun, CA 94585
Facility's Phone: (707) 432-4622
U.S. EPA ID Number: CAR000089466

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1.	Non-Hazardous Waste Solid (soil, drill cuttings)	01	CM	20	Y
2.					
3.					
4.					

13. Special Handling Instructions and Additional Information
9b1. Profile Number: PHLF-14-569 Bin # R29905 PL
Always wear proper PPE when handling this material
Send invoice to: ENV America // Project No. TAB1401

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: [illegible] Signature: Charles Pierce Month: 11 Day: 4 Year: 14

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Tom Chimpky Signature: [signature] Month: 11 Day: 14 Year: 14
Transporter 2 Printed/Typed Name: Signature: Month: Day: Year:

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Sharmaine Jones Signature: [signature] Month: 11 Day: 10 Year: 14

GC Labels • Printed in the USA 1-800-997-6966

DESIGNATED FACILITY TO GENERATOR

Reorder Part# MANIFEST-C6NHW 913-897-6966

Please print or type.
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	N/A	1	707-751-3817	NH-TAB1401110414-002

5. Generator's Name and Mailing Address
Taber Drilling
516 Galveston St.
West Sacramento, CA 95691
Generator's Phone: (919) 952-8546

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: ENV Environmental International, Inc.
U.S. EPA ID Number: CAR000247189

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Potrero Hills Landfill
3675 Potrero Hills Lane
Suisun, CA 94585
Facility's Phone: (707) 432-4622
U.S. EPA ID Number: CAR000089466

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non-Hazardous Waste Solid (soil, drill cuttings)	01	CM	20	Y	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
961 Profile Number: PHLF-14-569 Bin# R28452 PL
Always wear proper PPE when handling this material
Send Invoice to: ENV America // Project No. TAB1401

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Officer's Printed/Typed Name: Charles Pierce
Signature: Charles Pierce
Month: 11 Day: 4 Year: 14

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Tom Champley
Signature:
Month: 11 Day: 4 Year: 14
Transporter 2 Printed/Typed Name
Signature
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Sharmaine Jones
Signature: S Jones
Month: 11 Day: 14 Year:

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

GC Labels • Printed in the USA 1-800-997-6955

DESIGNATED FACILITY TO GENERATOR

Reorder Part# MANIFEST CONHW 913-897-6966

POTRERO HILLS LANDFILL, INC.
Weighed at:
POTRERO HILLS LANDFILL, INC.
P.O. Box 68
FAIRFIELD, CA 94533

Deputy: Janee Quinonez
Deposit: Sharmaine Jones
BILL TO: 137
ENV AMERICA/ENV ENVIROMNT

Vehicle ID: 524095
Reference: PHLF14569
Grid: 12N
HaulCust#: ORIGIN-W SACRAMENTO
DriverOn?: N
Route: NH-TAB14011110414-002,
TRLR/LP#: NH-TAB14011110414-003

Origin: WEST SACRAMENTO
DATE IN: 11/10/2014 TIME IN: 09:51:16
DATE OUT: 11/10/2014 TIME OUT: 12:08:21

INBOUND TICKET Number: 01-00517223

SCALE 1 GROSS WT.	93640	LB
SCALE 3 TARE WT.	42820	LB
NET WEIGHT	50820	LB

Qty	Description	Amount
25.41	Profile Soil-T ADC	

X_____

WEIGHMASTER CERTIFICATE:

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code), administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

X_____
(Deputy Signature)

This is to certify that this load does not contain any hazardous materials,

APPENDIX B

Laboratory Test Results

Environmental Test Results by Light, Air, & Space Construction

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SUMMARY OF LABORATORY RESULTS

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California

Borehole	Depth	Date Tested	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Screen Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
LB-1	3.0	11/4/2014	35	19	16	19	46	SC	9.0			
LB-1	16.0	11/4/2014							5.3	123.9	41	0.346
LB-1	21.0	11/4/2014				37.5	7		11.4	127.7	99	0.305
LB-1	26.0	11/4/2014							9.1	130.6	88	0.276
LB-1	36.0	11/4/2014				25	10		14.4	118.2	94	0.410
LB-2	3.0	11/4/2014							8.8	102.5	37	0.627
LB-2	6.0	11/4/2014				19	12		3.2			
LB-2	11.0	11/4/2014										
LB-2	16.0	11/4/2014				19	19		10.8	122.3	80	0.363
LB-2	21.0	11/4/2014				19	9		9.1	131.1	89	0.272
LB-2	25.5	11/4/2014				37.5	8					
LB-2	26.0	11/4/2014										
LB-2	31.0	11/4/2014				37.5	8		14.4			
LB-2	41.0	11/4/2014										
LB-2	46.0	11/4/2014										
LB-2	50.0	11/4/2014							11.2			
LB-3	11.0	10/22/2014				25	10		3.3			
LB-3	16.0	10/22/2014				19	9		9.9	124.5	78	0.339
LB-3	26.0	10/22/2014				0.075	5		12.0	115.2	72	0.446
LB-3	31.0	10/22/2014				0.075	9		12.9	132.3	132	0.260
LB-3	41.0	10/22/2014				0.075	27		17.2	114.1	99	0.461
LB-3	46.0	10/22/2014				9.5	26		33.6	89.0	103	0.873
LB-3	50.0	10/22/2014							3.3			
LB-4	3.0	10/22/2014							4.4			
LB-4	5.5	10/22/2014							4.7			
LB-4	10.0	10/22/2014				25	11		10.9			
LB-4	15.5	10/22/2014				4.75	39		33.1	92.8	111	0.802
LB-4	21.0	10/22/2014							14.1	121.8	102	0.368
LB-4	26.0	10/22/2014							12.0	129.7	112	0.285
LB-4	30.5	10/22/2014	36	17	19	0.075	64	CL	19.6	107.4	93	0.569
LB-4	36.0	10/22/2014				0.075	5		17.5	116.3	107	0.439
LB-4	41.0	10/22/2014							11.5			
LB-4	46.0	10/22/2014	55	19	36	0.075	65	CH				
WB-1	2.0	11/11/2014							144.7	31.5	90	4.343
WB-1	8.5	10/22/2014				12.5	10		10.8	121.9	78	0.368
WB-1	11.0	10/22/2014				25	11		8.8			
WB-1	16.0	10/22/2014				25	9		10.2			
WB-1	21.0	10/22/2014				0.075	13		10.4			
WB-1	26.0	10/22/2014				0.075	7		11.1			
WB-1	36.0	10/22/2014	29	26	3	25	21	SM	26.8			
WB-2	0.0	10/22/2014										
WB-2	2.0	11/11/2014							75.0	52.5	92	2.209
WB-2	12.0	10/22/2014				19	14		13.5			

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SUMMARY OF LABORATORY RESULTS

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California

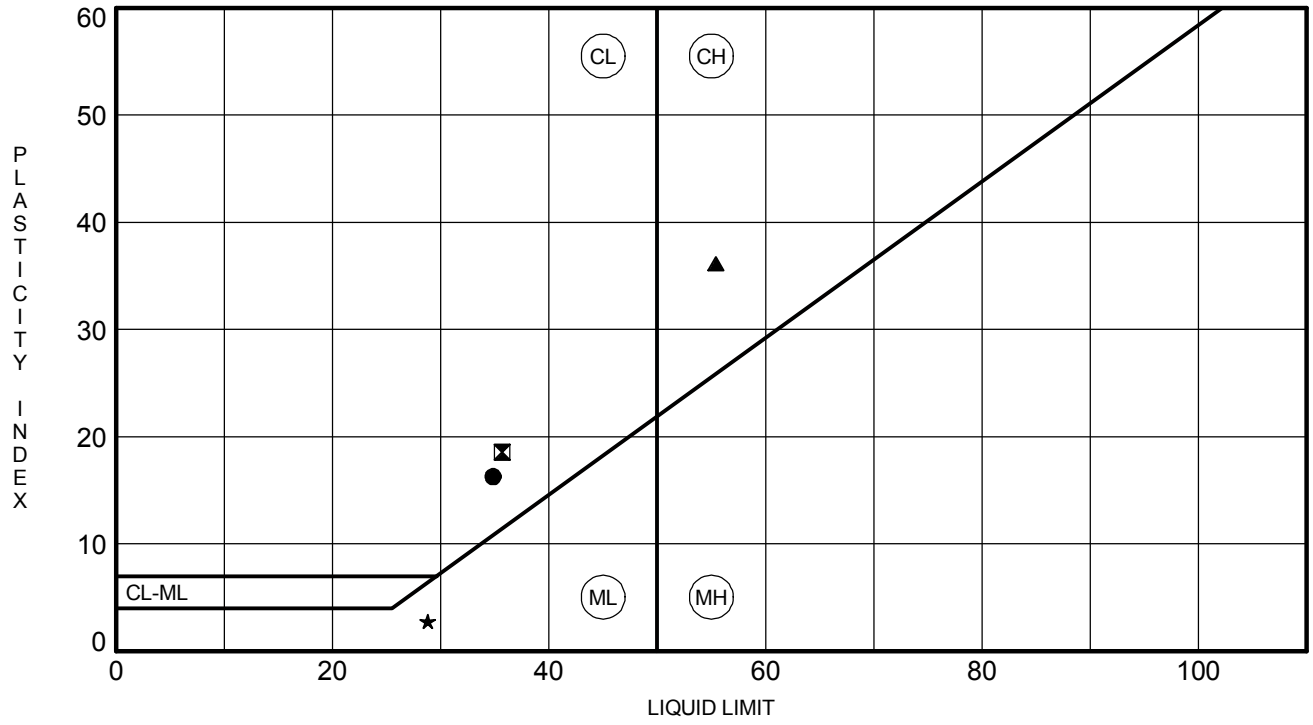
Borehole	Depth	Date Tested	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Screen Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
WB-2	17.0	10/22/2014				0.075	22		14.0			
WB-2	22.0	10/22/2014				0.075	6		7.3			
WB-2	27.0	10/22/2014										
WB-2	32.0	10/22/2014							11.0			
WB-2	42.0	10/22/2014				0.075	9					
WB-2	47.0	10/22/2014				0.075	10					
WB-3	4.0	11/11/2014				25	11		8.5			
WB-3	5.5	10/22/2014										

ATTERBERG LIMITS RESULTS

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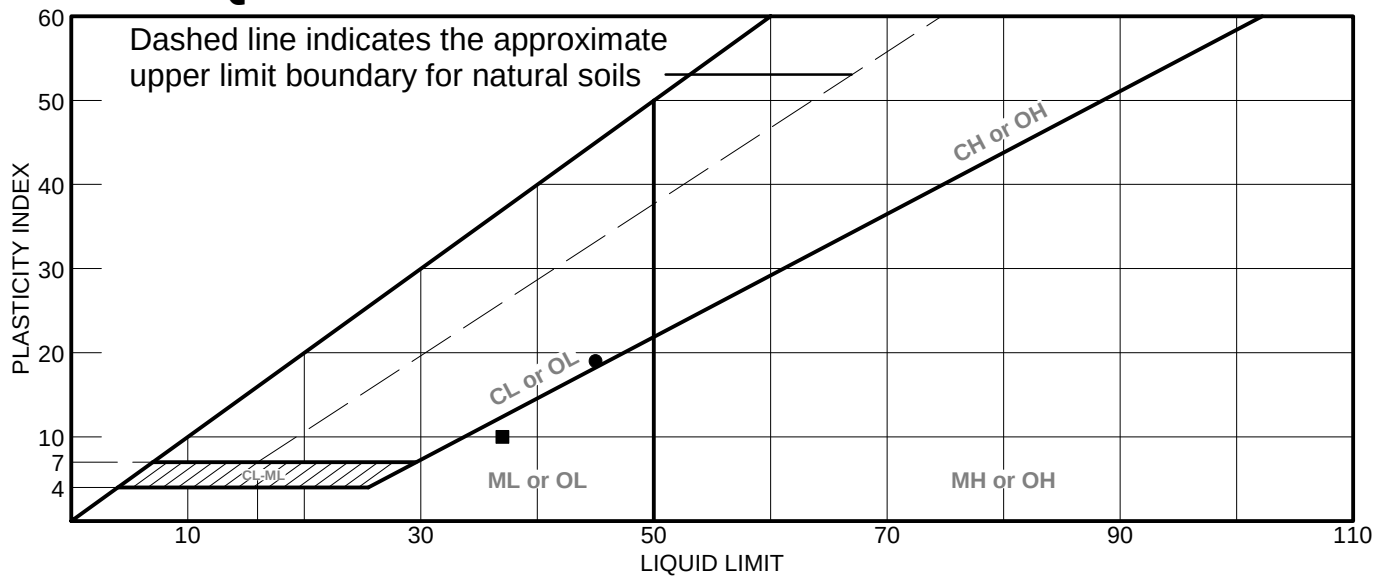
CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

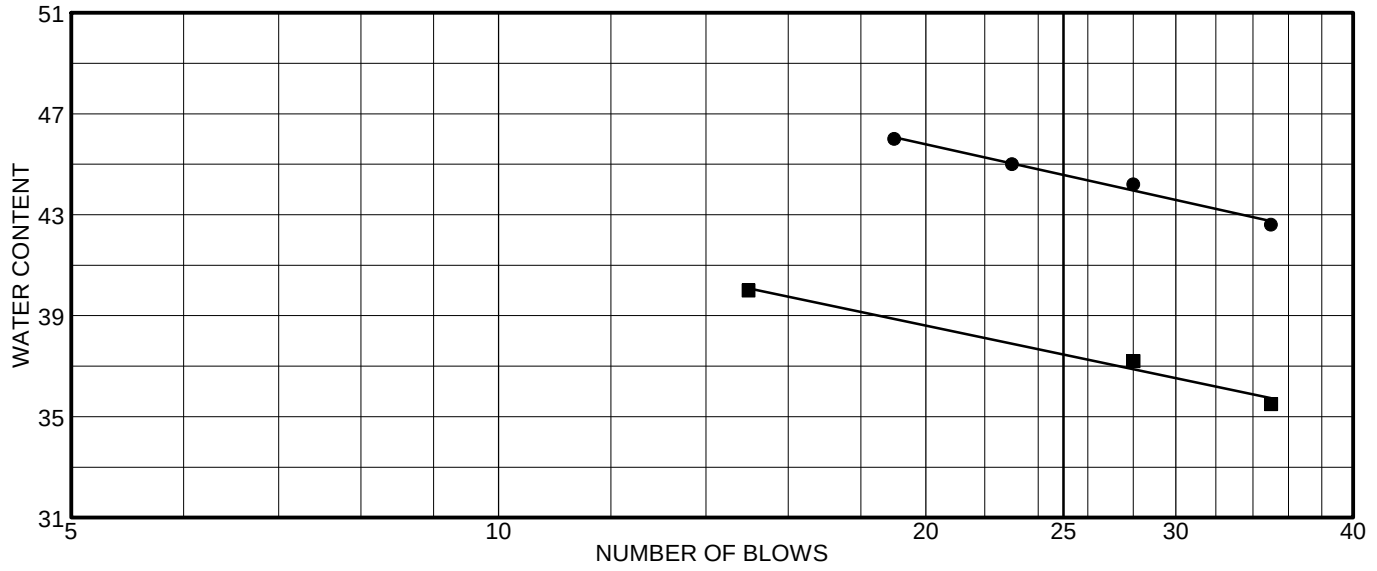
PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification	Date Tested
●	**LB-1**	**3.0**	**35**	**19**	**16**	**46**	**Fractured Sample**	**10/22/2014**
⊠	**LB-4**	**30.5**	**36**	**17**	**19**	**64**	**SANDY LEAN CLAY(CL)**	**10/22/2014**
▲	**LB-4**	**46.0**	**55**	**19**	**36**	**65**	**SANDY FAT CLAY(CH)**	**10/22/2014**
★	**WB-1**	**36.0**	**29**	**26**	**3**	**21**	**SILTY SAND with GRAVEL(SM)**	**10/22/2014**

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Gray Lean CLAY w/ Sand	45	26	19			
■	Dark Gray Organic Silty SAND	37	27	10			

Project No. 471-120 **Client:** Cal Engineering & Geology

Project: Almaden - 140540

● **Source:** WB-1 **Sample No.:** 1-3 **Elev./Depth:** 5'

■ **Source:** WB-2 **Sample No.:** 2-3 **Elev./Depth:** 8-10(Tip-4")

Remarks:

●

■

LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

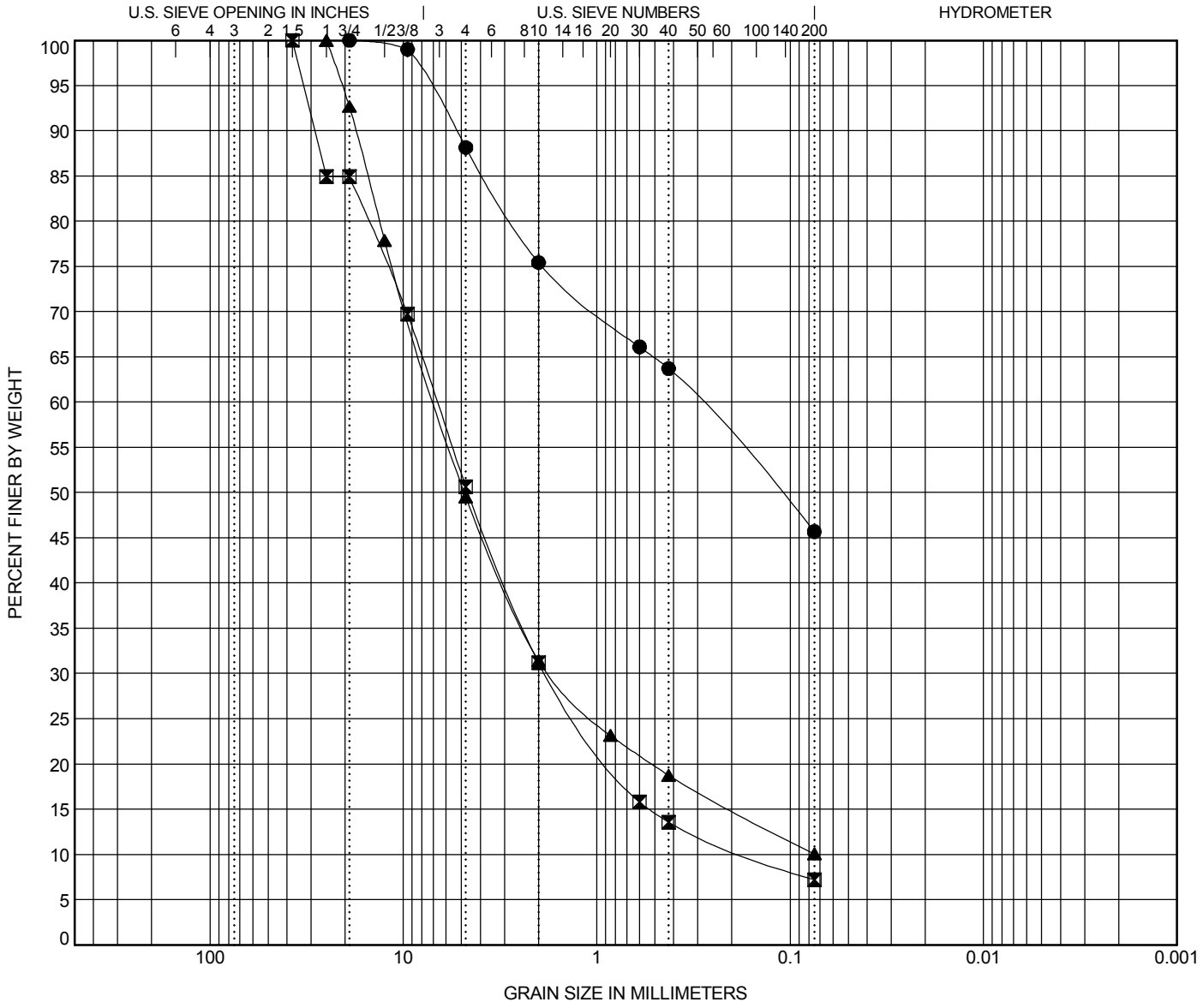
Figure

GRAIN SIZE DISTRIBUTION

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CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**LB-1**	**3.0**	**11/4/2014**	**Fractured Sample**					
⊠	**LB-1**	**21.0**	**11/4/2014**					**3.07**	**41.28**
▲	**LB-1**	**36.0**	**11/4/2014**					**5.94**	**91.41**

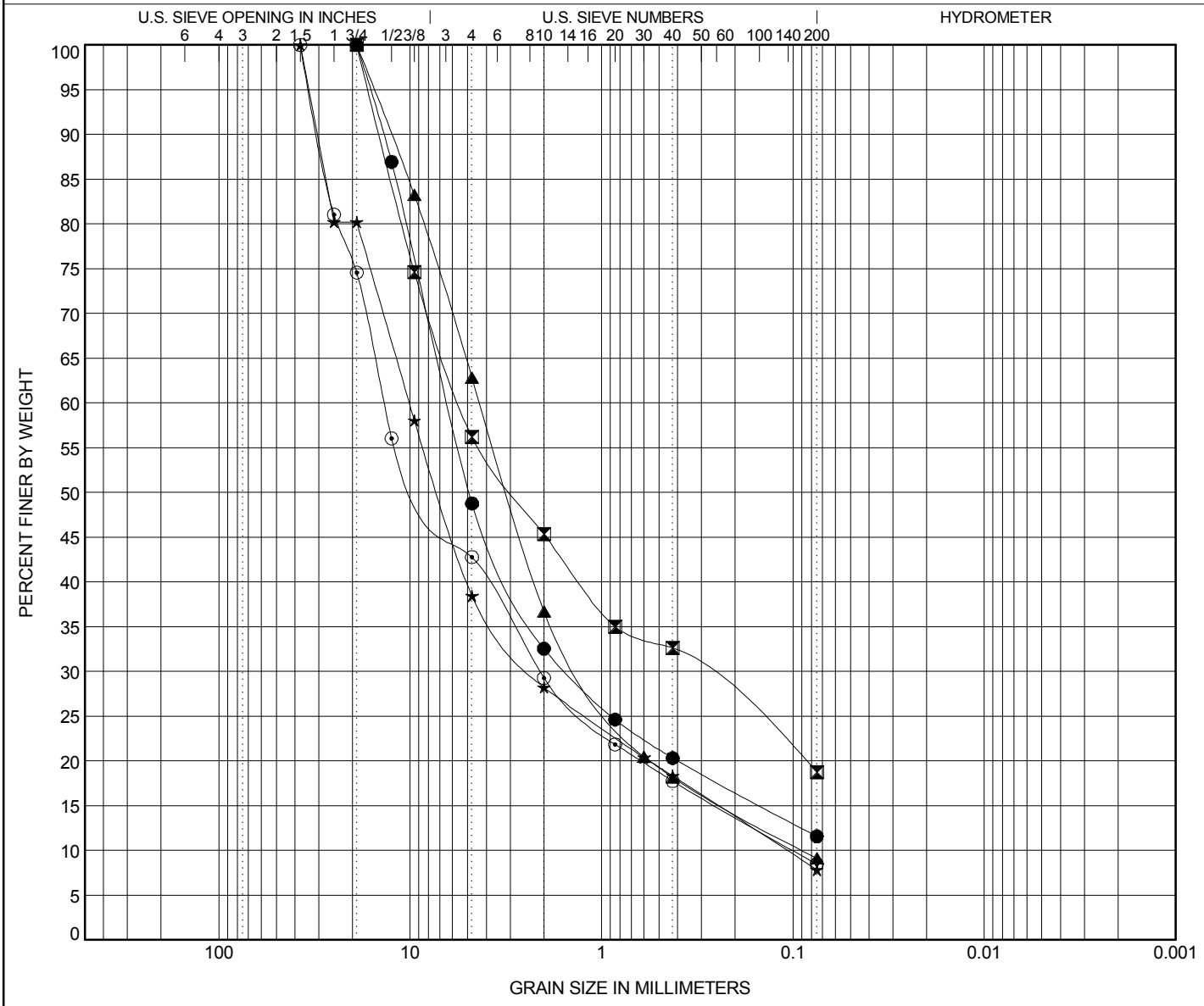
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**LB-1**	**3.0**	**19**	**0.297**			**11.8**	**42.5**	**45.7**	
⊠	**LB-1**	**21.0**	**37.5**	**6.676**	**1.822**	**0.162**	**49.4**	**43.5**	**7.2**	
▲	**LB-1**	**36.0**	**25**	**6.792**	**1.731**		**50.5**	**39.5**	**10.0**	

GRAIN SIZE DISTRIBUTION

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CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE		DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**LB-2**	**6.0**	**11/4/2014**	**Fractured Sample**				**6.65**	**115.31**
⊠	**LB-2**	**16.0**	**11/4/2014**						
▲	**LB-2**	**21.0**	**11/4/2014**					**3.87**	**48.86**
★	**LB-2**	**25.5**	**11/4/2014**					**4.99**	**94.31**
⊙	**LB-2**	**31.0**	**11/4/2014**	**Fractured Sample**				**3.22**	**137.20**

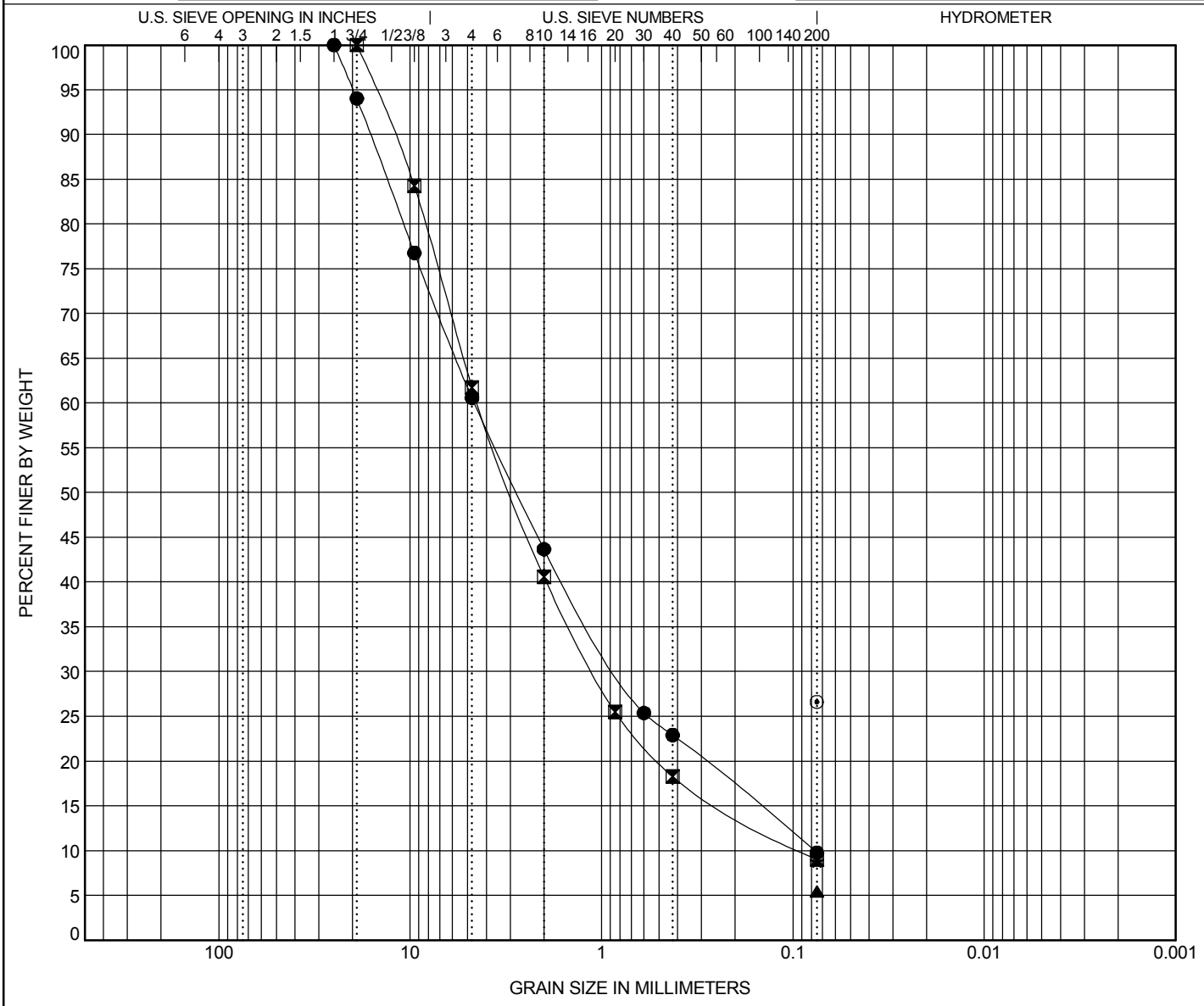
BOREHOLE		DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**LB-2**	**6.0**	**19**	**6.313**	**1.517**		**51.2**	**37.2**	**11.6**	
⊠	**LB-2**	**16.0**	**19**	**5.479**	**0.306**		**43.8**	**37.4**	**18.8**	
▲	**LB-2**	**21.0**	**19**	**4.323**	**1.216**	**0.088**	**37.2**	**53.7**	**9.1**	
★	**LB-2**	**25.5**	**37.5**	**10.093**	**2.322**	**0.107**	**61.5**	**30.6**	**7.9**	
⊙	**LB-2**	**31.0**	**37.5**	**13.669**	**2.094**	**0.1**	**57.2**	**34.3**	**8.5**	

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GRAIN SIZE DISTRIBUTION

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**LB-3**	**11.0**	**10/22/2014**	**Fractured Sample**				**1.85**	**59.44**
⊠	**LB-3**	**16.0**	**10/22/2014**					**3.01**	**48.91**
▲	**LB-3**	**26.0**	**10/22/2014**						
★	**LB-3**	**31.0**	**10/22/2014**						
⊙	**LB-3**	**41.0**	**10/22/2014**						

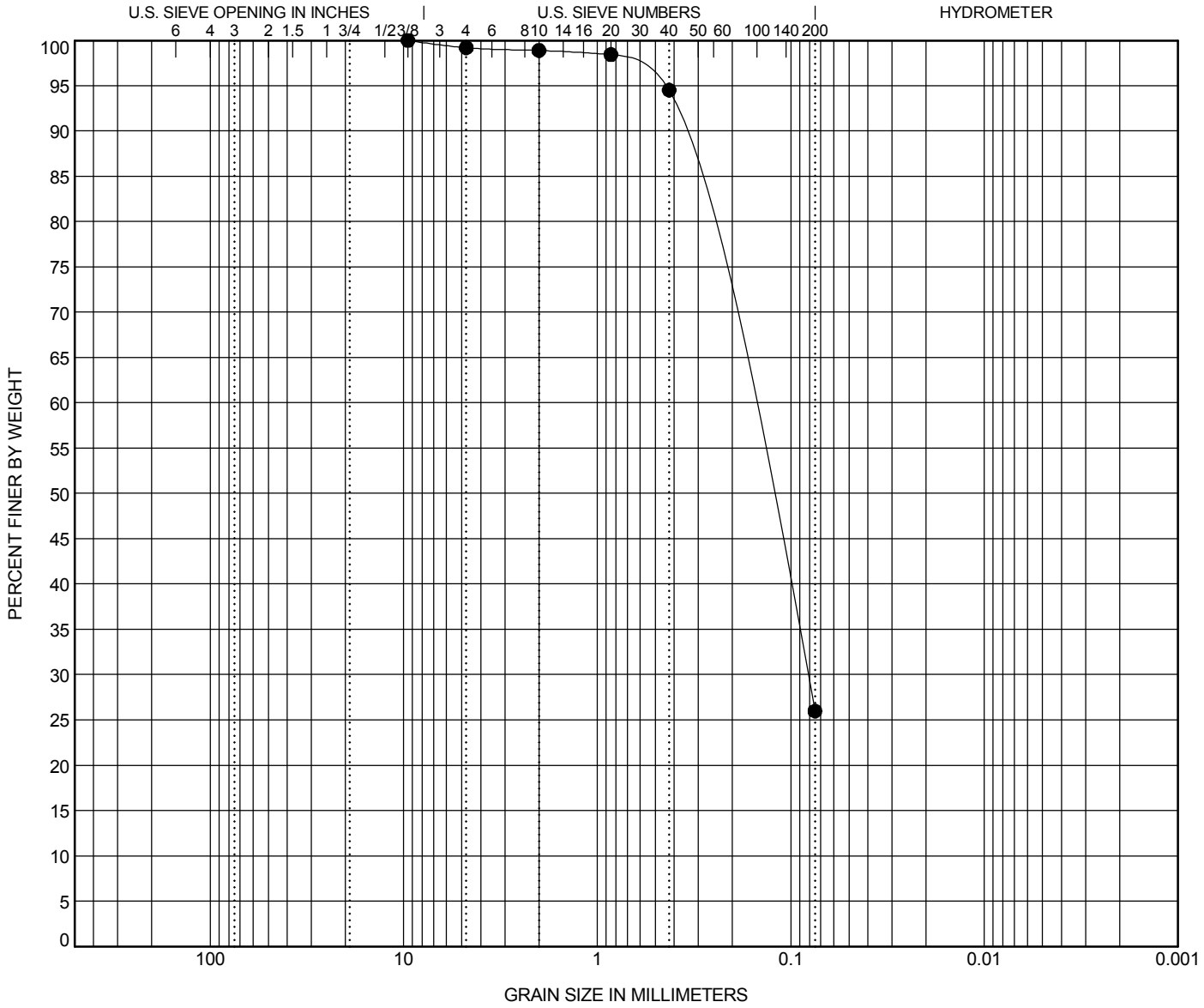
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**LB-3**	**11.0**	**25**	**4.609**	**0.814**	**0.078**	**39.4**	**50.8**	**9.7**	
⊠	**LB-3**	**16.0**	**19**	**4.426**	**1.099**	**0.09**	**38.3**	**52.7**	**9.0**	
▲	**LB-3**	**26.0**	**0.075**						**5.4**	
★	**LB-3**	**31.0**	**0.075**						**8.8**	
⊙	**LB-3**	**41.0**	**0.075**						**26.6**	

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GRAIN SIZE DISTRIBUTION

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
● **LB-3**	**46.0**	**10/22/2014**						

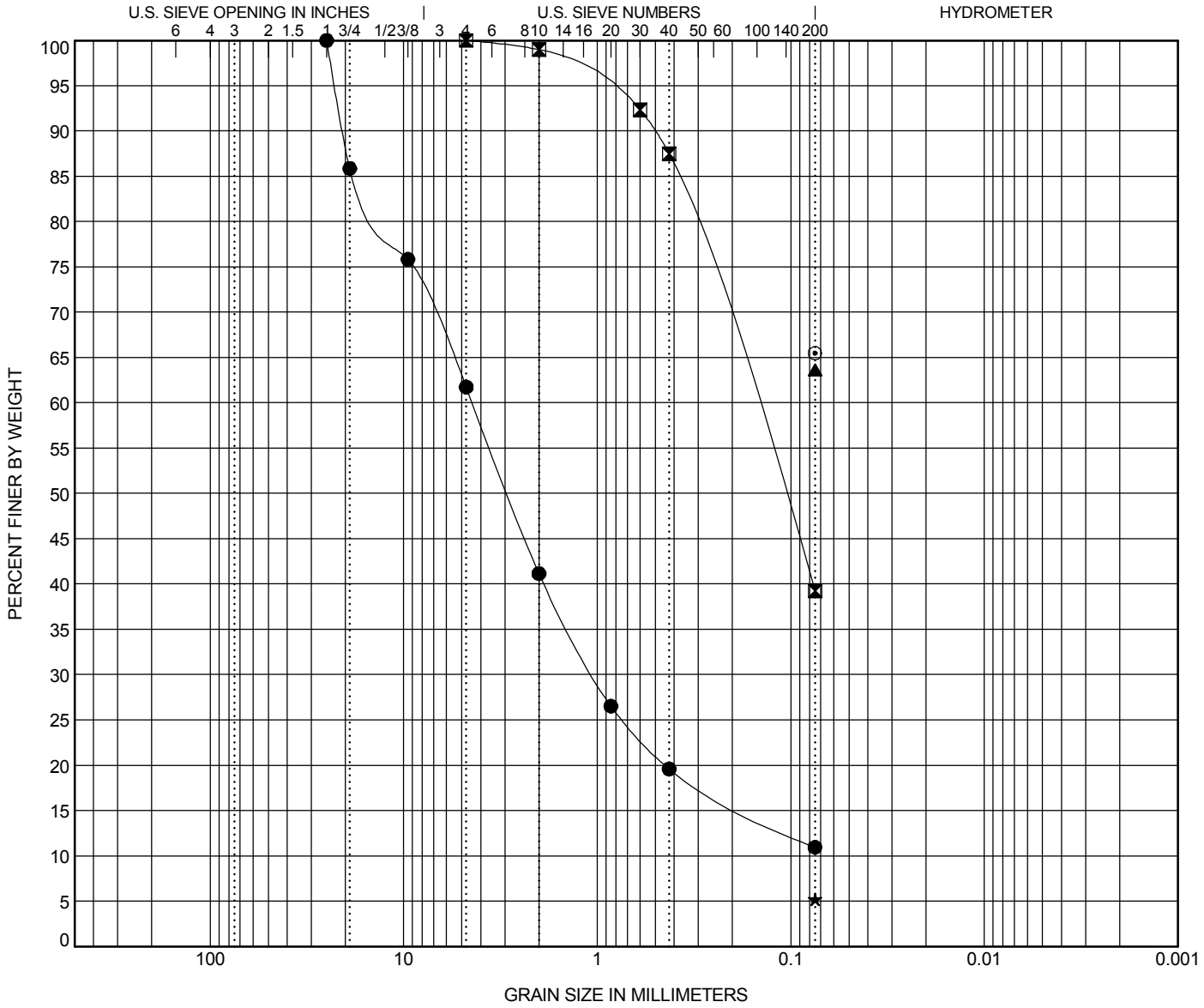
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **LB-3**	**46.0**	**9.5**	**0.177**	**0.083**		**0.8**	**73.2**	**26.0**	

GRAIN SIZE DISTRIBUTION

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CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**LB-4**	**10.0**	**10/22/2014**					**3.96**	**71.08**
⊠	**LB-4**	**15.5**	**10/22/2014**						
▲	**LB-4**	**30.5**	**10/22/2014**	**SANDY LEAN CLAY(CL)**	**36**	**17**	**19**		
★	**LB-4**	**36.0**	**10/22/2014**						
⊙	**LB-4**	**46.0**	**10/22/2014**	**SANDY FAT CLAY(CH)**	**55**	**19**	**36**		

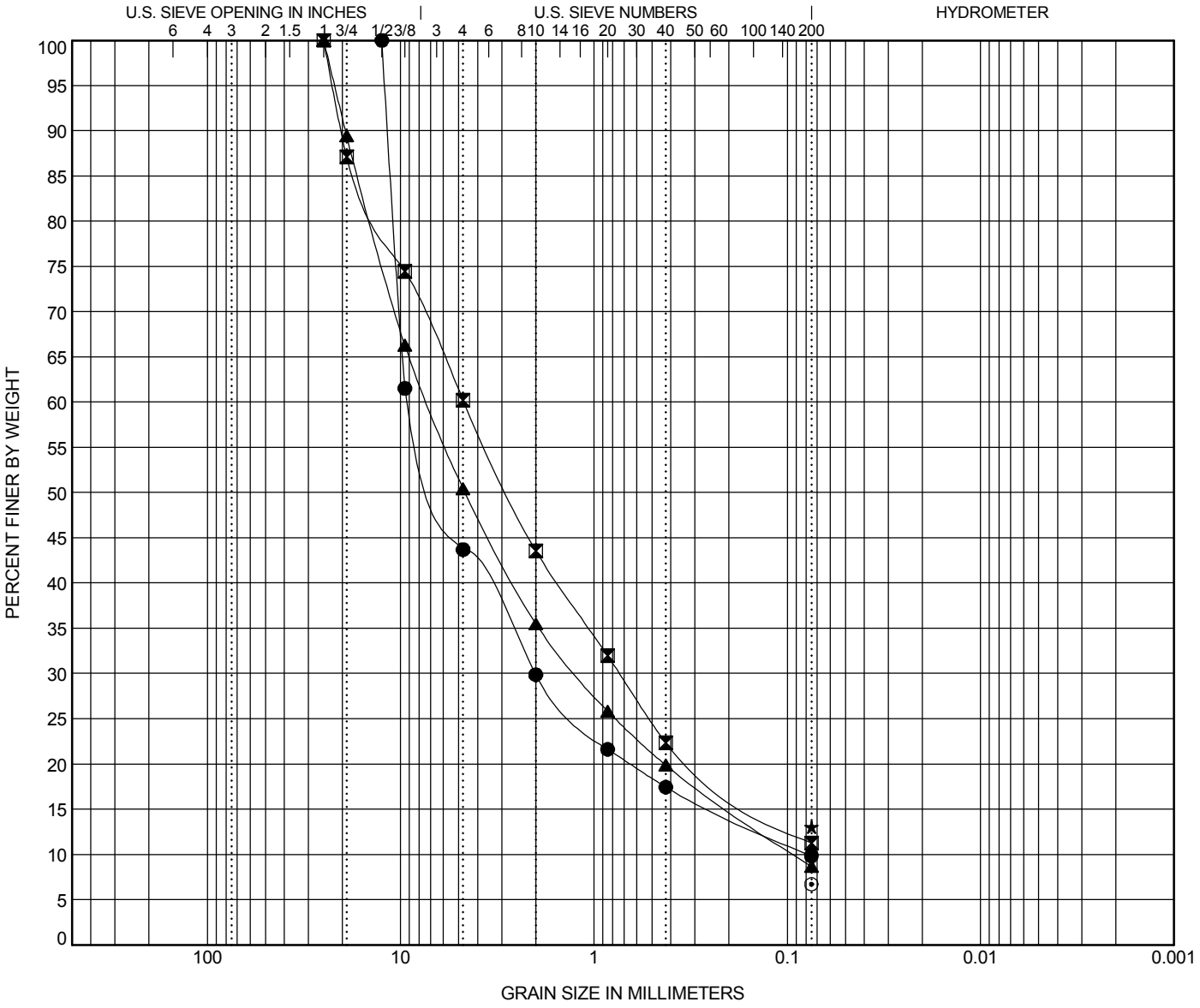
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**LB-4**	**10.0**	**25**	**4.416**	**1.042**		**38.3**	**50.8**	**10.9**	
⊠	**LB-4**	**15.5**	**4.75**	**0.158**			**0.0**	**60.8**	**39.2**	
▲	**LB-4**	**30.5**	**0.075**						**63.7**	
★	**LB-4**	**36.0**	**0.075**						**5.2**	
⊙	**LB-4**	**46.0**	**0.075**						**65.5**	

GRAIN SIZE DISTRIBUTION

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CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**WB-1**	**8.5**	**10/22/2014**					**5.83**	**114.78**
⊠	**WB-1**	**11.0**	**10/22/2014**					**1.88**	**76.40**
▲	**WB-1**	**16.0**	**10/22/2014**					**2.28**	**78.23**
★	**WB-1**	**21.0**	**10/22/2014**						
⊙	**WB-1**	**26.0**	**10/22/2014**						

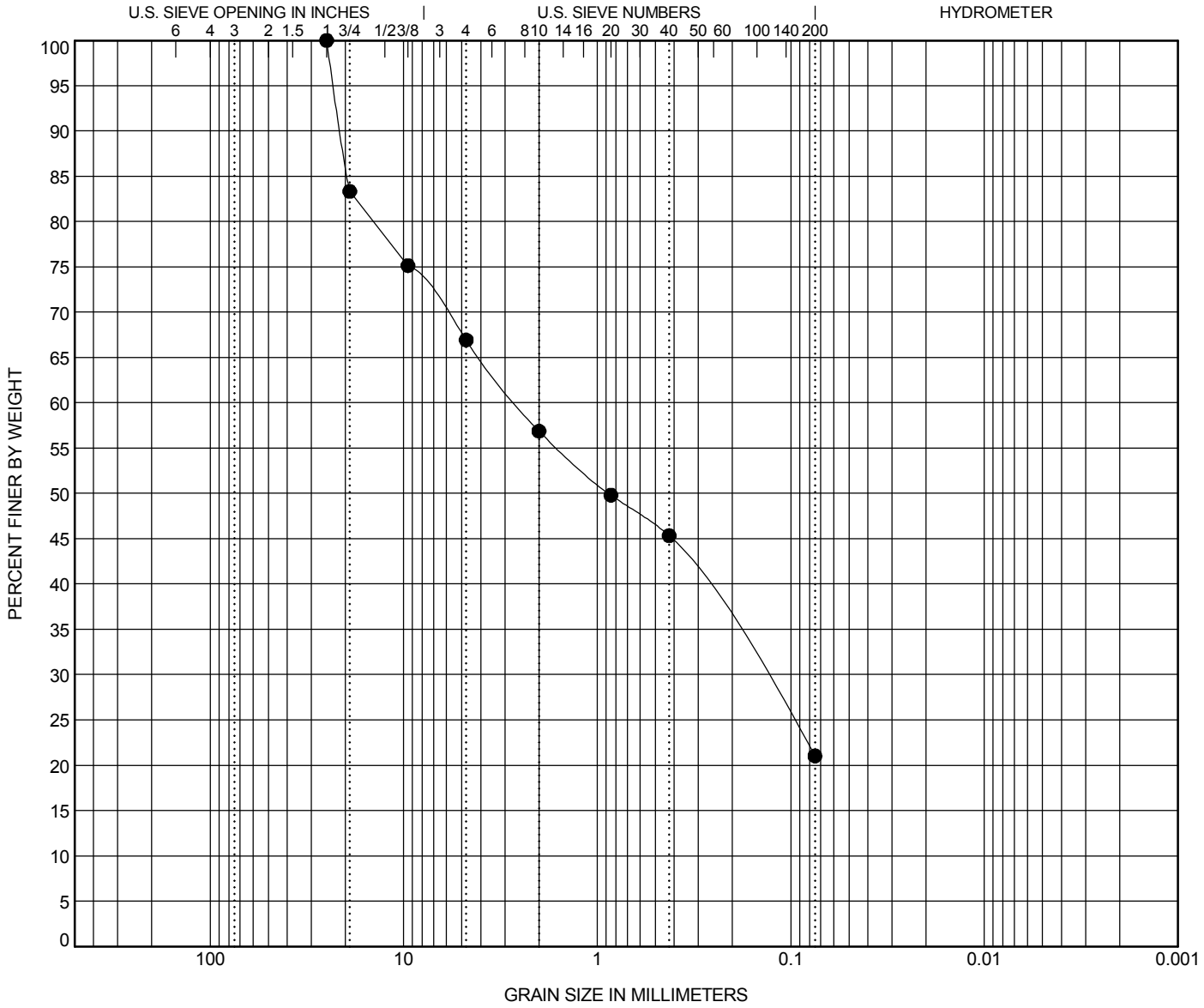
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**WB-1**	**8.5**	**12.5**	**8.956**	**2.018**	**0.078**	**56.3**	**33.9**	**9.8**	
⊠	**WB-1**	**11.0**	**25**	**4.7**	**0.737**		**39.8**	**48.9**	**11.3**	
▲	**WB-1**	**16.0**	**25**	**7.214**	**1.231**	**0.092**	**49.6**	**41.8**	**8.7**	
★	**WB-1**	**21.0**	**0.075**						**13.0**	
⊙	**WB-1**	**26.0**	**0.075**						**6.7**	

GRAIN SIZE DISTRIBUTION

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CAL ENGINEERING & GEOLOGY

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**WB-1**	**36.0**	**10/22/2014**	**SILTY SAND with GRAVEL(SM)**	**29**	**26**	**3**		

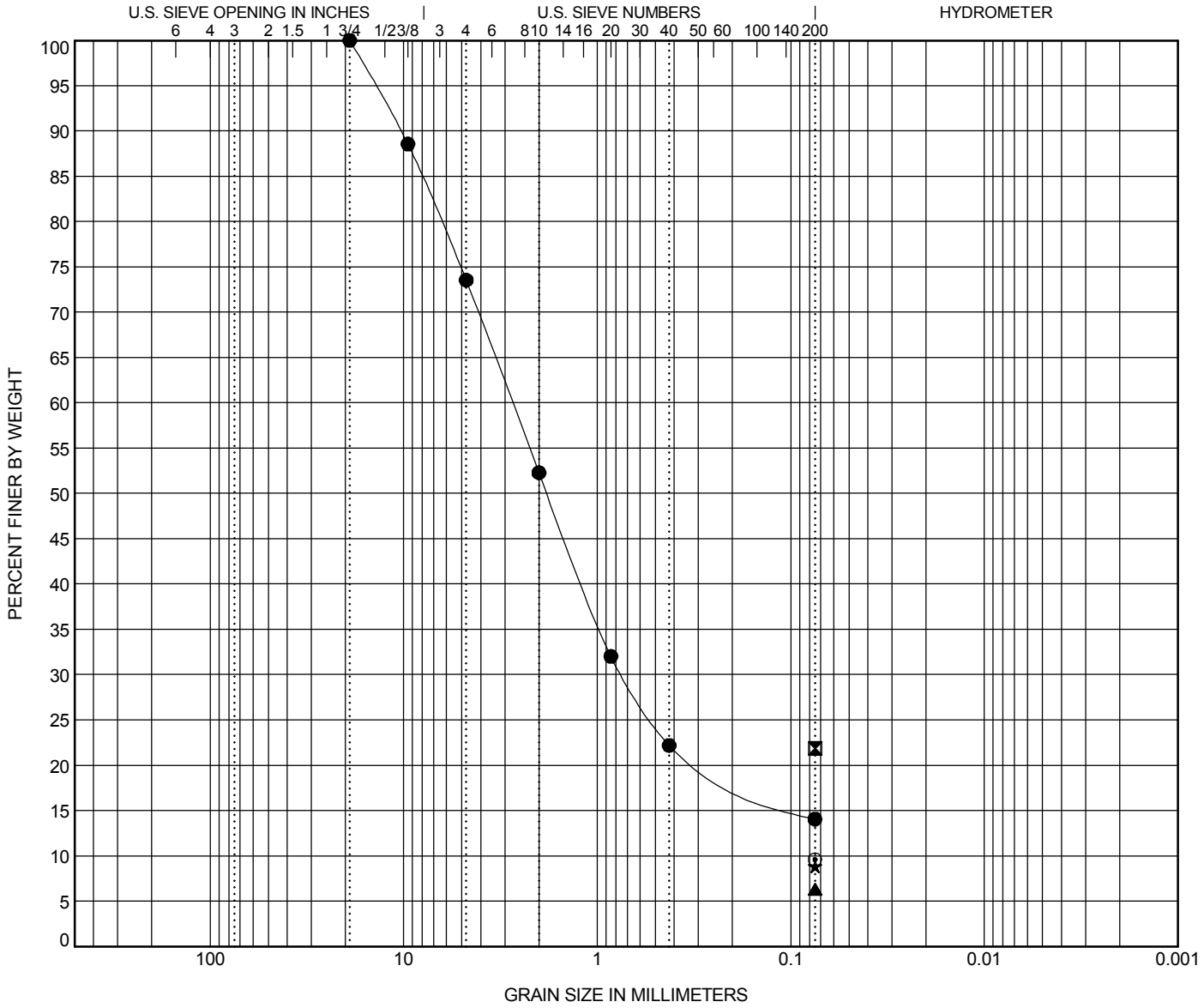
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**WB-1**	**36.0**	**25**	**2.618**	**0.142**		**33.1**	**45.9**	**21.0**	

GRAIN SIZE DISTRIBUTION

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CAL ENGINEERING & GEOLOGY

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**WB-2**	**12.0**	**10/22/2014**						
⊠	**WB-2**	**17.0**	**10/22/2014**						
▲	**WB-2**	**22.0**	**10/22/2014**						
★	**WB-2**	**42.0**	**10/22/2014**						
⊙	**WB-2**	**47.0**	**10/22/2014**						

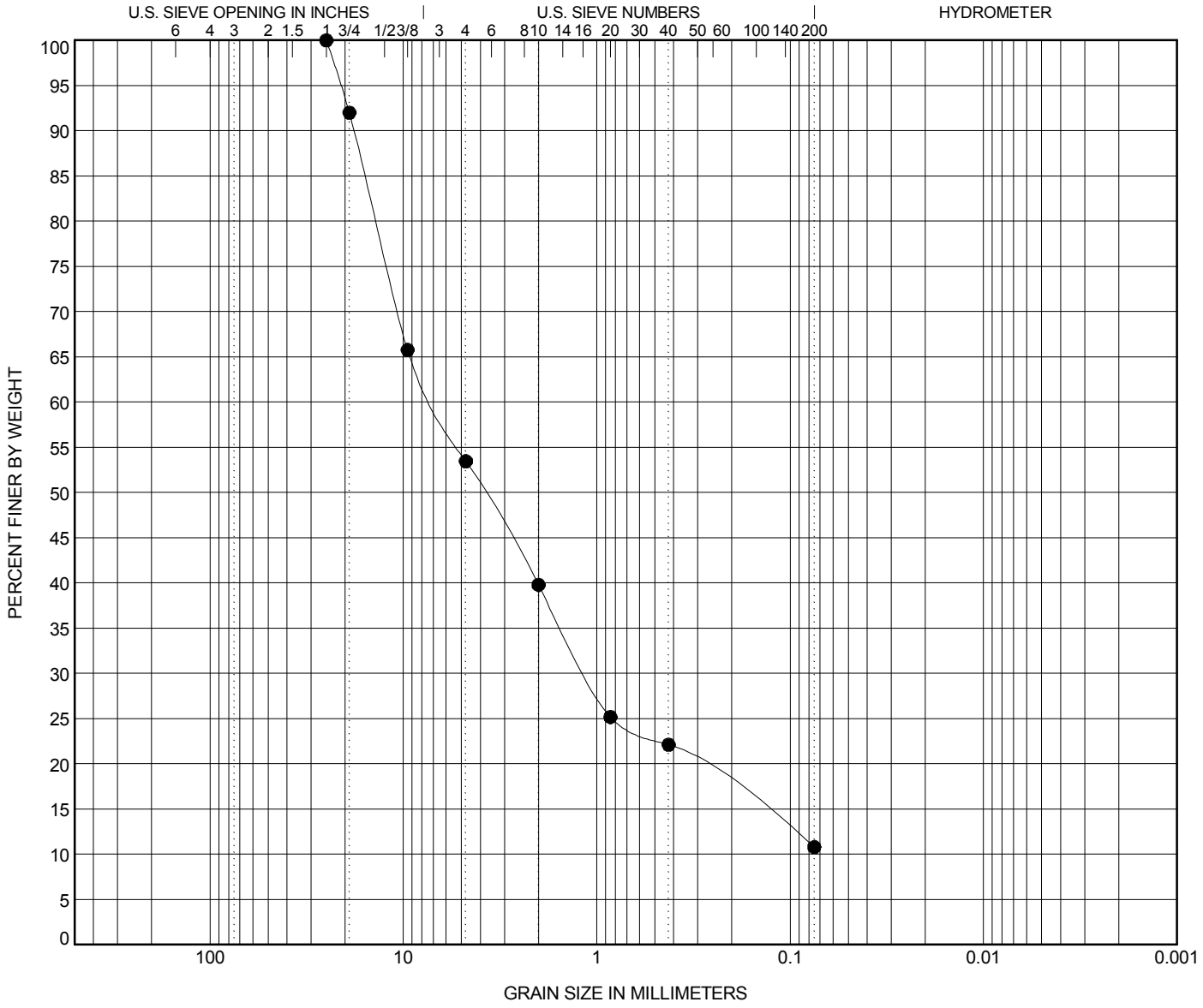
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**WB-2**	**12.0**	**19**	**2.738**	**0.738**		**26.5**	**59.5**	**14.0**	
⊠	**WB-2**	**17.0**	**0.075**						**21.9**	
▲	**WB-2**	**22.0**	**0.075**						**6.3**	
★	**WB-2**	**42.0**	**0.075**						**8.8**	
⊙	**WB-2**	**47.0**	**0.075**						**9.6**	

CE&G
CAL ENGINEERING & GEOLOGY

GRAIN SIZE DISTRIBUTION

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
● **WB-3**	**4.0**	**11/11/2014**					**2.79**	**103.48**

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **WB-3**	**4.0**	**25**	**6.863**	**1.126**		**46.5**	**42.7**	**10.8**	

#200 Sieve Wash Analysis
ASTM D 1140

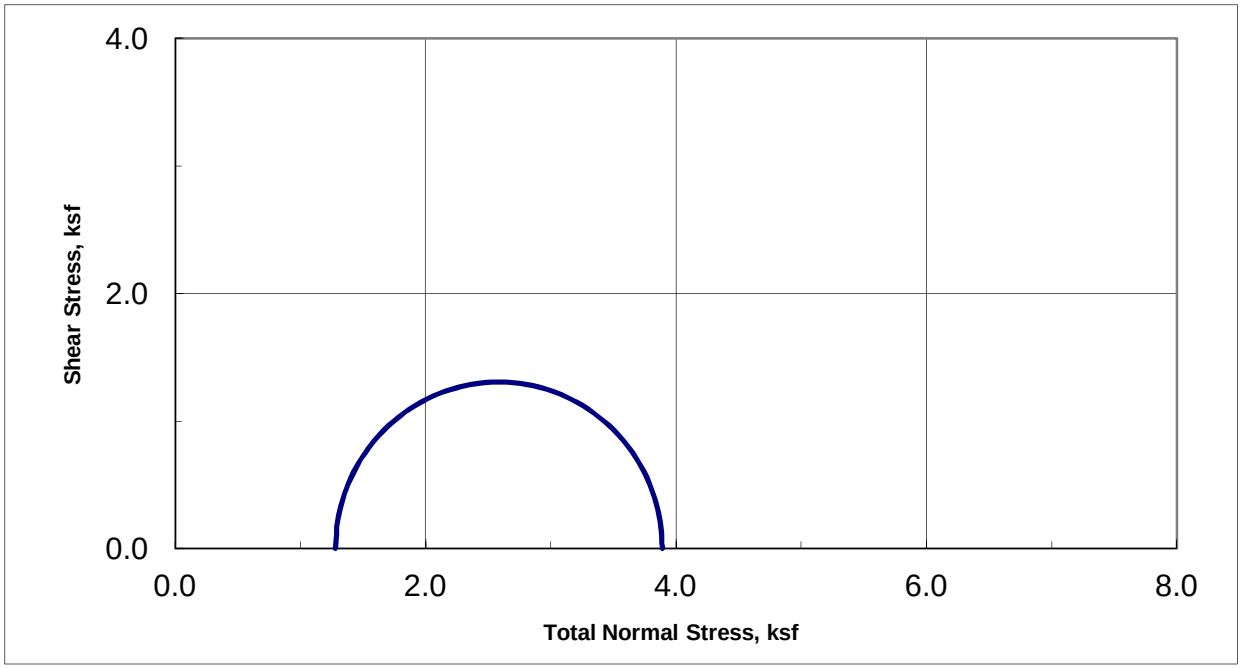
Job No.:	471-120	**Project No.:**	140540	**Run By:**	MD
Client:	CE&G	**Date:**	11/3/2014	**Checked By:**	DC
Project:	Almaden				

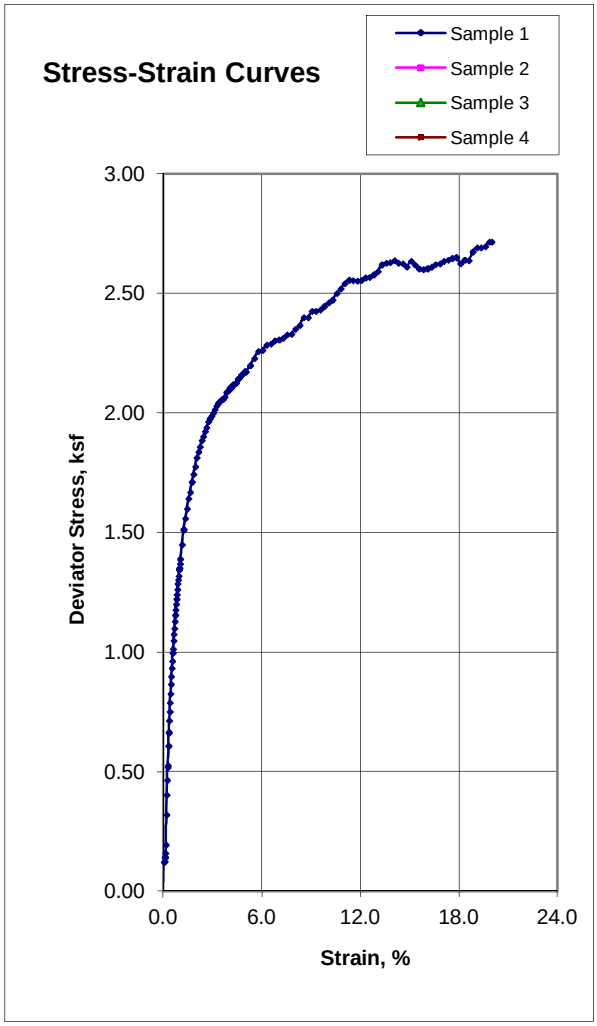
Boring:	WB-1	WB-2	LB-1					
Sample:	1-3	2-3	1-4					
Depth, ft.:	5	8-10(Tip-4")	10.5					
Soil Type:	Dark Gray Lean CLAY w/ Sand	Dark Gray Organic Silty SAND	Very Dark Gray Clayey SAND w/ Gravel					
Wt of Dish & Dry Soil, gm	323.7	546.9	664.5					
Weight of Dish, gm	134.7	324.1	209.4					
Weight of Dry Soil, gm	189.0	222.8	455.0					
Wt. Ret. on #4 Sieve, gm	0.0	0.7	169.6					
Wt. Ret. on #200 Sieve, gm	33.7	129.8	381.2					
% Gravel	**0.0**	**0.3**	**37.3**					
% Sand	**17.8**	**57.9**	**46.5**					
% Silt & Clay	**82.2**	**41.7**	**16.2**					

Remarks: As an added benefit to our clients, the gravel fraction may be included in this report. Whether or not it is included is dependent upon both the technician's time available and if there is a significant enough amount of gravel. The gravel is always included in the percent retained on the #200 sieve but may not be weighed separately to determine the percentage, especially if there is only a trace amount, (5% or less).

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data	1	2	3	4
Moisture %	8.4			
Dry Den,pcf	120.2			
Void Ratio	0.403			
Saturation %	56.5			
Height in	4.97			
Diameter in	2.38			
Cell psi	8.9			
Strain %	15.00			
Deviator, ksf	2.611			
Rate %/min	1.00			
in/min	0.050			
Job No.:	471-120			
Client:	Cal Engineering & Geology			
Project:	140540			
Boring:	LB-1			
Sample:	1-4			
Depth ft:	10.5			

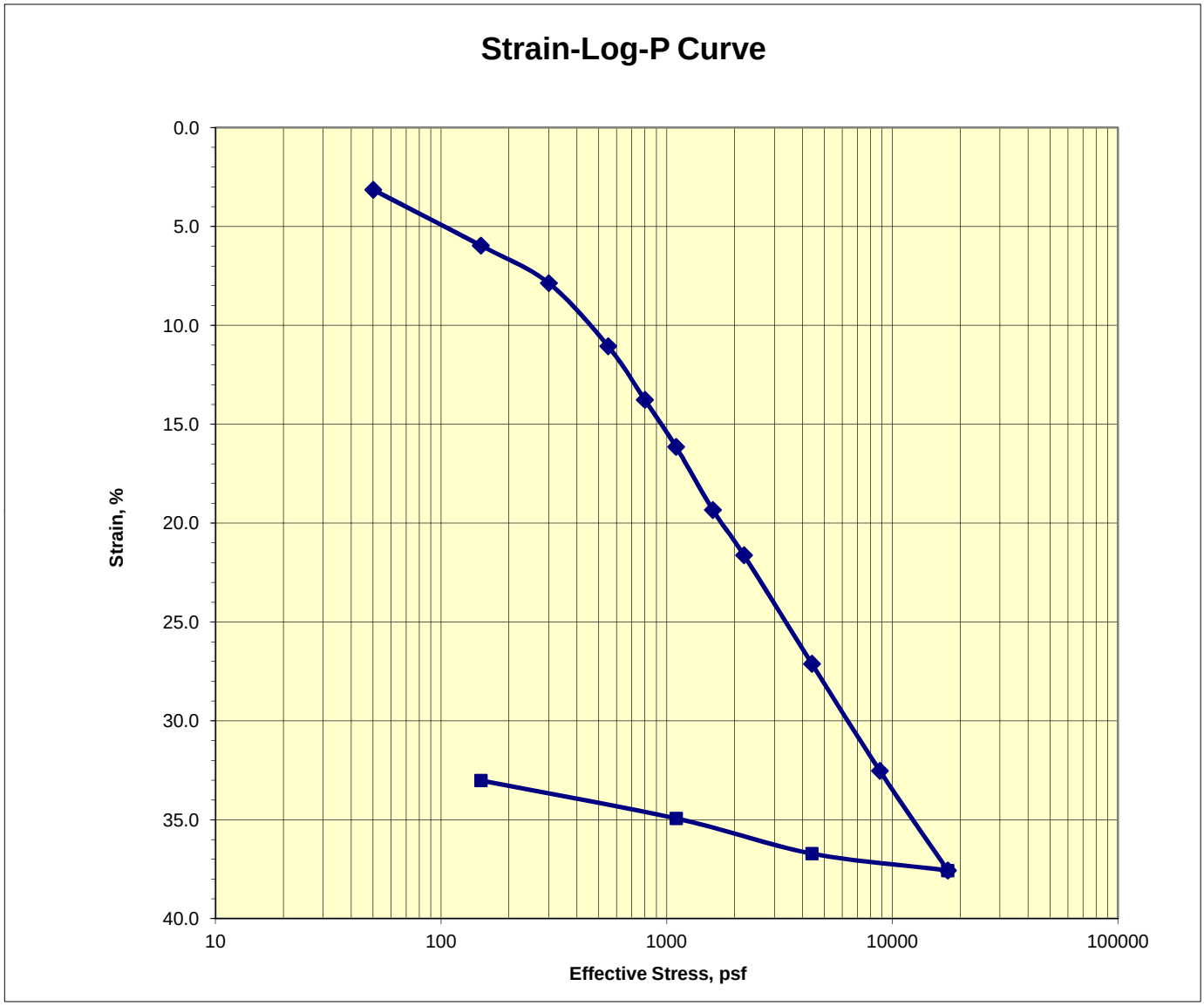
Visual Soil Description	
Sample #	
1	Very Dark Gray Clayey SAND w/ Gravel
2	
3	
4	

Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Consolidation Test
ASTM D2435

Job No.:	471-120	**Boring:**	WB-1	**Run By:**	MD
Client:	Cal Engineering & Geology	**Sample:**	1-3	**Reduced:**	PJ
Project:	Almaden - 140540	**Depth, ft.:**	5(Tip-5")	**Checked:**	PJ/DC
Soil Type:	Dark Gray Lean CLAY w/ Sand			**Date:**	11/4/2014

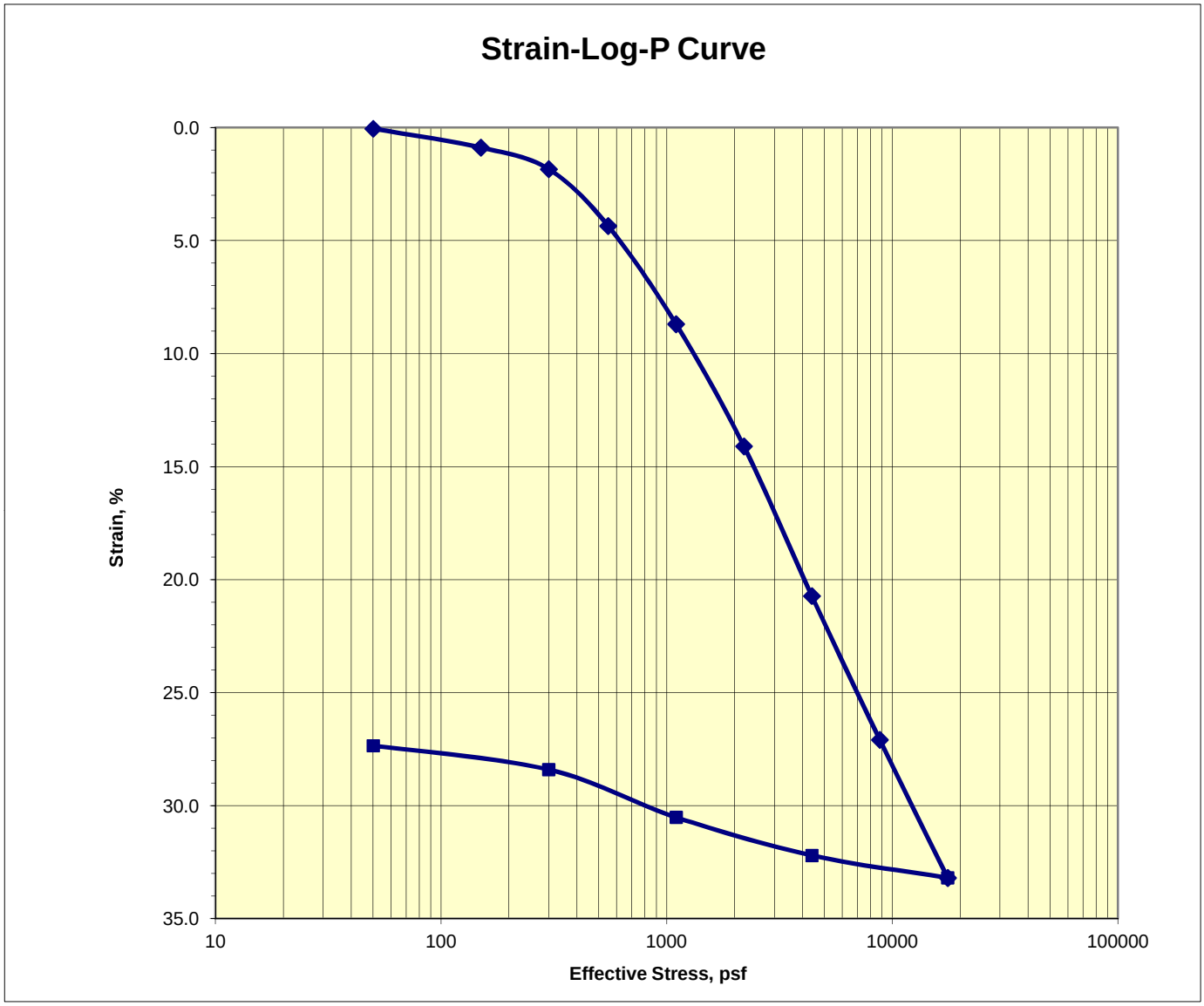


Assumed Gs 2.7	Initial	Final
Moisture %:	71.7	35.9
Dry Density, pcf:	55.0	85.5
Void Ratio:	2.064	0.971
% Saturation:	93.8	100.0

Remarks:

Consolidation Test
ASTM D2435

Job No.:	471-120	**Boring:**	WB-2	**Run By:**	MD
Client:	Cal Engineering & Geology	**Sample:**	2-3	**Reduced:**	PJ
Project:	Almaden - 140540	**Depth, ft.:**	8-10(Tip-4")	**Checked:**	PJ/DC
Soil Type:	Dark Gray Organic Silty SAND			**Date:**	11/3/2014



Assumed Gs 2.65	Initial	Final
Moisture %:	68.9	40.4
Dry Density, pcf:	55.2	79.9
Void Ratio:	1.998	1.071
% Saturation:	91.4	100.0

Remarks:

LIGHT, AIR & SPACE CONSTRUCTION
ENVIRONMENTAL SERVICES COMPANY
State Contractor's License Number 445403
State EPA R.E.A. Number 04072

March 18, 2015
LA&S Project # 1515

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Attn: James Ujah

Subject: Results of Metals Testing from Lake Bottom Sediment Samples Collected from Lake Almaden.

Dear Mr. Ujah,

Light, Air and Space Construction (LA&S) has prepared this Letter Report presenting our comments concerning the metals testing conducted on lake bottom samples from Lake Almaden in San Jose. LA&S understands that grading work is planned along the shoreline and the District wants opinions from a technical consultant concerning re-use/disposal options for the soil.

I. Sampling and Testing Activities

Four (4) discrete sediment samples were collected by a drilling contractor employed by the District working from a barge on Lake Almaden. Sediment sample WB-1-2 was obtained from a depth of 3' to 3.5' below top of sediment. Sediment sample WB-1-4 was obtained from a depth of 8' below top of sediment. Sediment sample WB-2-2 was obtained from a depth of 3'-3.5' below top of sediment and Sediment sample WB-2-4 was obtained from a depth of 9.5' to 10' below top of sediment.

The actual four (4) sample locations were not provided to LA&S by the District for this report. The sediment samples were collected in pre-cleaned lab supplied sampling containers. Chain-of-Custody records were used to track the sediment samples from the time of collection through receipt by the analytical laboratory. The sediment samples were kept iced or refrigerated from the time of collection until the time of analysis. A fully signed Chain-of-Custody record was returned with the final laboratory reports (provided in Appendix B of this report).

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WETLAND AND RIPARIAN HABITAT – ASSESSMENT – DESIGN – RESTORATION – CONSTRUCTION – MITIGATION MONITORING

All sediment samples were individually tested for CAM17 group of metals, which consists of antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium and zinc. All analysis was performed using regulatory accepted, standard test methods by the District's contract, state-certified lab (TestAmerica), including QA/QC protocols.

II. **Data Evaluation and Comments**

No field observations of contamination (e.g., suspicious odors or discolorations) were evident or reported during any of the sampling activities. Test America's laboratory reports for this project's testing are presented in Appendix A.

Table 1 immediately following this section provides a summary of the data. The two columns on the right-hand side list the most commonly used environmental screening levels (ESLs; per California Regional Water Quality Control Board-San Francisco Bay, December 2013) and the California thresholds for hazardous waste classification. All entries are presented in milligrams per kilogram (mg/kg), which is parts per million. The listed ESLs are the "default, Tier 1" values that assume an unrestricted land use and underlying groundwater of potential drinking water use. There are numerous other ESLs for situations of lower risk concern to human health and the environment.

Sediment sample WB-1-2 exceeded the ESLs with Arsenic at 5.0 ppm, Mercury at 29ppm and Nickel at 190ppm. Sediment sample WB-1-4 exceeded the ESLs with Arsenic at 3.4 ppm. Sediment sample WB-2-2 exceeded the ESLs with Arsenic at 5.7 ppm, Mercury at 26ppm and Nickel at 180ppm. Sediment sample WB-2-4 exceeded the ESLs with Arsenic at 6.6 ppm and Mercury at 17ppm. Measured sediment samples that exceed the listed ESL criteria in Table 1 are highlighted in red.

All detected amounts of total arsenic exceed the 0.39 mg/kg residential ESL. However, measured concentrations are generally consistent with naturally-occurring concentrations for Bay Area soils. The California Environmental protection Agency's Department of Toxic Substances Control (DTSC) considers an arsenic concentration of 12 mg/kg to be a useful screening level in consideration of potential soil contamination for sensitive site uses such as schools (DTSC, August 2008, *Interim Guide for Sampling Agricultural Properties, Third Revision, Section 5.2.1).* The RWQCB-SF endorses an upper estimate for background arsenic of 11 mg/kg for land settings, such as this project encompasses. The highest measured arsenic in this evaluation was only 6.6 mg/kg.

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The other detected metal concentrations that exceeded the ESLs were Sediment sample WB-1-2 Mercury at 29ppm and Nickel at 190ppm. Sediment sample WB-2-2 Mercury at 26ppm and Nickel at 180ppm. Sediment sample WB-2-4 Mercury at 17ppm. Although there were no background tests conducted, these concentrations are also considered naturally occurring, based on other investigations LA&S has conducted in the area and Guadalupe watershed.

TABLE 1

Metals (mg/kg)	WB-1-2 (3'-3.5')	WB-1-4 (8')	WB-2-2 (3.5'-4.0')	WB-2-4 (9.5'-10.0')	ESLs (Dec2013) (mg/kg)	Calif HazWaste TTLC (mg/kg)
Antimony	0.85	1.2	1.4	0.54	20	500
Arsenic	5.0	3.4	5.7	6.6	0.39	500
Barium	91	79	110	120	750	10,000
Beryllium	ND	ND	0.16	0.17	4.0	75
Cadmium	0.15	ND	0.18	0.26	12	100
Chromium (total)	120	93	100	77	1,000	2,500
Cobalt	16	15	16	13	23	8,000
Copper	29	39	25	25	230	2,500
Lead	11	3.1	26	47	80	1,000
Mercury	29	4.5	26	17	6.7	20
Molybdenum	ND	ND	ND	ND	40	3,500
Nickel	190	130	180	140	150	2,000
Selenium	ND	ND	ND	ND	10	100
Silver	ND	ND	ND	ND	20	500
Thallium	ND	ND	ND	ND	0.78	700
Vanadium	40	61	37	34	200	2,400
Zinc	56	65	52	63	800	5,000

III. **Opinions and Conclusions**

Based upon the subject exploration and sediment soil testing, the Lake Almaden soil appears aggregately suitable for on-site re-use for purposes such as re-sculpturing the Lake Almaden basin and Los Alamito Creek channel. The material should also be acceptable for offsite disposal at a standard (i.e. non-hazardous, Class III) landfill. Due to the ESL exceedances, it may be difficult to find a non-landfill, offsite re-use for the subject sediment soil. Commercial property fills and embankment construction projects are two potentially viable types of re-uses. The demand for excess soil and specific projects involving earthwork are constantly changing.

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LA&S does not believe that it would be cost effective to try to segregate soils that exceed multiple ESLs from those that have the low background arsenic ESL exceedance. Further, it is possible prospective offsite disposal/re-use options may require testing for additional parameters/chemicals before acceptance.

IV. **Limitations**

This Letter Report was prepared specifically for the SCVWD, and the use of this report by third parties is entirely at their own risk. The interpretations and conclusions made herein are based upon the reported analytical metal data for the cited sediment soil samples. Point sample locations and laboratory analytical results are inherently limited and do not provide a warranty as to the conditions that may exist throughout the lake bottom. Such a warranty is impossible to achieve. Conditions may also change over time. Additionally, the available soil re-use options and landfill acceptance criteria must be recognized as non-static. Depending upon the specific re-use or disposal options being considered at the time of grading, metal concentrations currently considered acceptable may at that time disqualify the material.

Prepared by:

_____
David B. Guthridge, Principal

Attachment: Appendix A: Certified Laboratory Report and Chain-of Custody

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Almaden Lake Project Fill Quantities

	Alternative #4		Alternative # 6		Alternative # 7	
Component	Area (Ac)	Fill (CY)	Area (Ac)	Fill (CY)	Area (Ac)	Fill (CY)
East Lake	18	159,762	17	163,420	19	156,540
Levee	2.6	70,435	1.635	52,622	1.9	67,212
West Bank Maint Rd	0.4	12,935	0	0	0	0
Channel	8.2	160,390	11	226,395	10	194,833
New West Park Space	3.8	129,241	2	69,342	2	67,212
Island	0.75	21,780	0.75	21,780	0.75	21,780
New Island	0.75	43,560	0.75	43,560	0.75	43,560
Total Fill		598,103		577,119		551,137

James Ujah

From: Jack Xu
Sent: Tuesday, March 17, 2015 9:48 AM
To: James Ujah
Subject: Drawdown Time
Attachments: Drawdown Time 100-yr Hydrograph.xlsx

Hi James,

See attached spreadsheet for calculated drawdown time. The unsteady model behaves a little differently than the steady model, so I used the most upstream cross section (70+00), which was the closest in elevation to the steady design model you had, and offset the elevation to match yours. Assuming a critical elevation of 200', there was about 2:45 of drawdown time.

Santa Clara Valley Water District

Jack Xu, PE, CFM
Hydraulics, Hydrology, & Geomorphology
Watersheds Division
(408) 630-2913

APPENDIX C

Liquefaction Evaluation

CE&G
CAL ENGINEERING & GEOLOGY

DOCUMENT REVIEW COVER SHEET

1. PROJECT NAME	2. PROJECT NUMBER
Almaden Lake Improvement Project	140540

3. DOCUMENT TITLE
Appendix C Liquefaction Analysis

4. DOCUMENT STATUS DESIGNATION
☐ Preliminary ☒ Final ☐ Cancelled

5. NOTES/COMMENTS
The purpose of this calculation is to perform liquefaction analysis at each of the land and water boring locations using index properties obtained from the laboratory testing program.

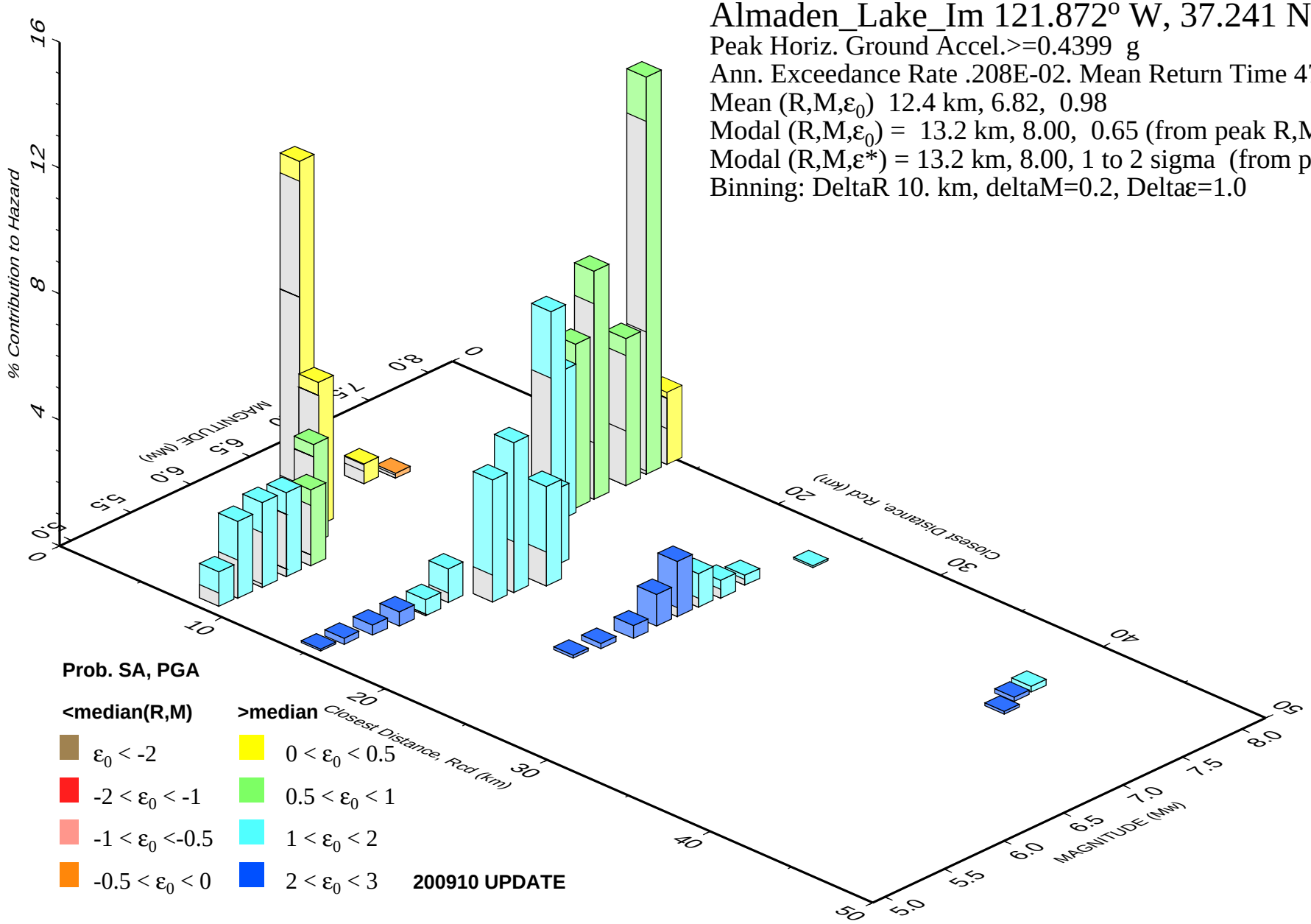
ATTACHMENTS	TOTAL NO. OF PAGES
USGS seismic deaggregation	1
Land Boring LB-1 Liquefaction Analysis	3
Land Boring Lb-2 Liquefaction Analysis	3
Land Boring Lb-3 Liquefaction Analysis	3
Land Boring Lb-4 Liquefaction Analysis	3
Water Boring Wb-1 Liquefaction Analysis	3
Water Boring Wb-2 Liquefaction Analysis	3

RECORD OF REVISIONS

6. NO.	7. REASON FOR REVISION	8. TOT. PGS	10. ORIGINATOR (PRINT/SIGN/DATE)	11. CHECKER (PRINT/SIGN/DATE)	12. QA/QC (PRINT/SIGN/DATE)	13. APPRVD./ACCPTD (PRINT/SIGN)	14. DATE (M/D/YY)
1	Final Issue	19	Eli Zane	Dan Peluso	Dan Peluso	Dan Peluso	4/30/15

PSH Deaggregation on NEHRP BC rock
Almaden_Lake_Im 121.872º W, 37.241 N.

Peak Horiz. Ground Accel.>=0.4399 g
Ann. Exceedance Rate .208E-02. Mean Return Time 475 years
Mean (R,M,ε_0) 12.4 km, 6.82, 0.98
Modal (R,M,ε_0) = 13.2 km, 8.00, 0.65 (from peak R,M bin)
Modal (R,M,ε*) = 13.2 km, 8.00, 1 to 2 sigma (from peak R,M,ε bin)
Binning: DeltaR 10. km, deltaM=0.2, Deltaε=1.0



Cal Engineering & Geology
Oakland, CA 510.451.2350
Walnut Creek, CA 925.935.9771
San Jose, CA 408.440.4542

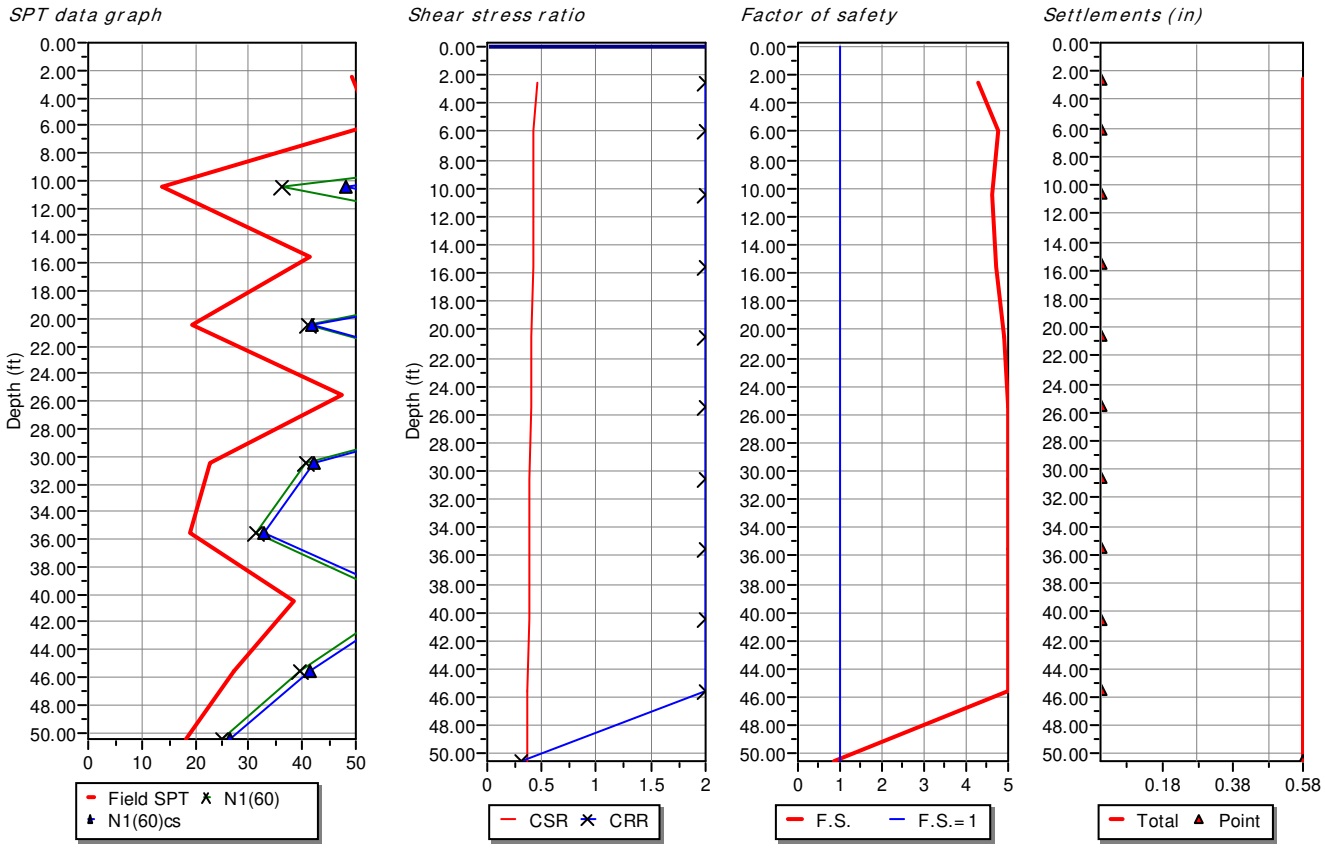
LIQUEFACTION ANALYSIS REPORT

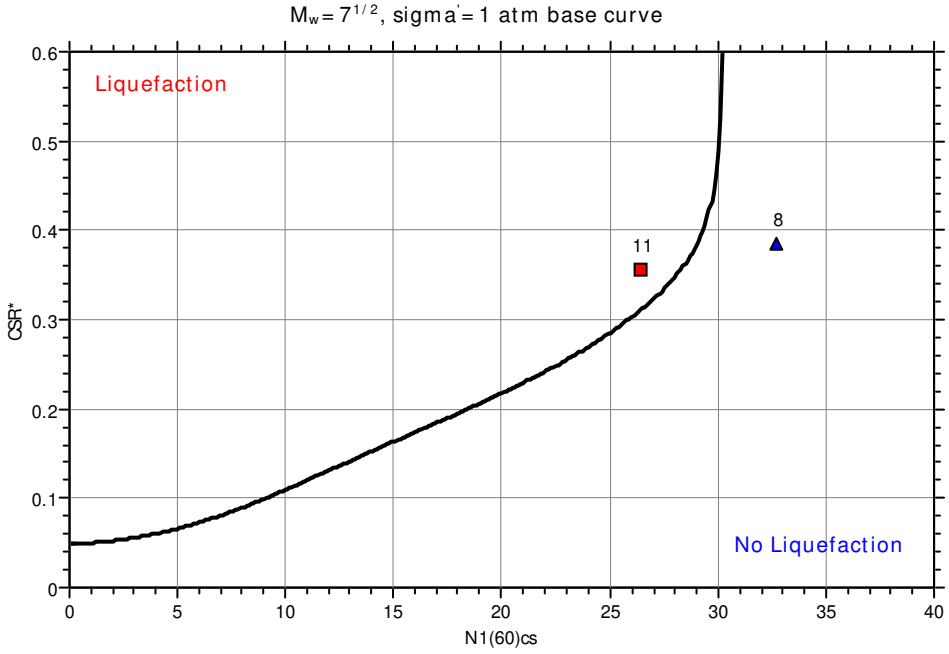
Project title : Almaden Lake Improvements

Project subtitle : LB-1

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	0.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.82
Analysis method:	NCEER 1998	Peak ground accelaration:	0.44 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.00





:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	2.50	49.40	120.00	46.00
2	6.00	53.00	140.00	10.00
3	10.50	13.65	120.00	60.00
4	15.50	41.60	130.00	15.00
5	20.50	19.50	142.00	7.00
6	25.50	47.45	143.00	7.00
7	30.50	22.80	140.00	10.00
8	35.50	18.90	135.00	10.00
9	40.50	38.40	140.00	10.00
10	45.50	27.30	135.00	10.00
11	50.50	18.20	140.00	10.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	2.50	0.15	0.08	0.07	0.99	0.59	1.28	0.46	1.00	0.46
2	6.00	0.40	0.19	0.21	0.99	0.54	1.28	0.42	1.00	0.42
3	10.50	0.67	0.33	0.34	0.98	0.55	1.28	0.43	1.00	0.43
4	15.50	0.99	0.48	0.51	0.96	0.54	1.28	0.42	1.00	0.42
5	20.50	1.35	0.64	0.70	0.95	0.52	1.28	0.41	1.00	0.41
6	25.50	1.70	0.80	0.91	0.94	0.51	1.28	0.40	1.00	0.40
7	30.50	2.05	0.95	1.10	0.93	0.49	1.28	0.39	0.99	0.39
8	35.50	2.39	1.11	1.28	0.89	0.47	1.28	0.37	0.96	0.39
9	40.50	2.74	1.26	1.48	0.85	0.45	1.28	0.35	0.93	0.38
10	45.50	3.08	1.42	1.66	0.80	0.43	1.28	0.34	0.91	0.37
11	50.50	3.43	1.58	1.85	0.76	0.40	1.28	0.32	0.89	0.36

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M= 7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	49.40	1.70	1.45	1.05	0.75	1.20	115.07	28.01	143.09	2.00
2	53.00	1.70	1.45	1.05	0.80	1.20	131.69	3.72	135.41	2.00
3	13.65	1.70	1.45	1.05	0.85	1.20	36.04	12.21	48.24	2.00
4	41.60	1.44	1.45	1.05	0.95	1.20	103.72	7.49	111.20	2.00
5	19.50	1.22	1.45	1.05	0.95	1.20	41.19	0.47	41.66	2.00
6	47.45	1.07	1.45	1.05	0.95	1.20	88.40	0.87	89.27	2.00
7	22.80	0.97	1.45	1.05	1.00	1.20	40.58	1.75	42.33	2.00
8	18.90	0.90	1.45	1.05	1.00	1.20	31.17	1.54	32.71	2.00
9	38.40	0.84	1.45	1.05	1.00	1.20	59.02	2.15	61.16	2.00
10	27.30	0.79	1.45	1.05	1.00	1.20	39.60	1.73	41.32	2.00
11	18.20	0.75	1.45	1.05	1.00	1.20	24.98	1.41	26.39	0.31

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	143.09	119.24	4.30	0.00	0.00
2	135.41	112.84	4.75	0.00	0.00
3	48.24	40.20	4.63	0.00	0.00
4	111.20	92.67	4.73	0.00	0.00
5	41.66	34.72	4.91	0.00	0.00
6	89.27	74.39	5.00	0.00	0.00
7	42.33	35.27	5.00	0.00	0.00
8	32.71	27.26	5.00	0.00	0.00
9	61.16	50.97	5.00	0.00	0.00
10	41.32	34.43	5.00	0.00	0.00
11	26.39	21.99	0.87	1.93	0.58

Total settlement : 0.58

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.00	9.62	0.00
2	0.00	9.09	0.00
3	0.00	8.40	0.00
4	0.00	7.64	0.00
5	0.00	6.88	0.00
6	0.00	6.11	0.00
7	0.00	5.35	0.00
8	0.00	4.59	0.00
9	0.00	3.83	0.00
10	0.00	3.07	0.00
11	0.13	2.30	0.45

Overall potential I_L : 0.45

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

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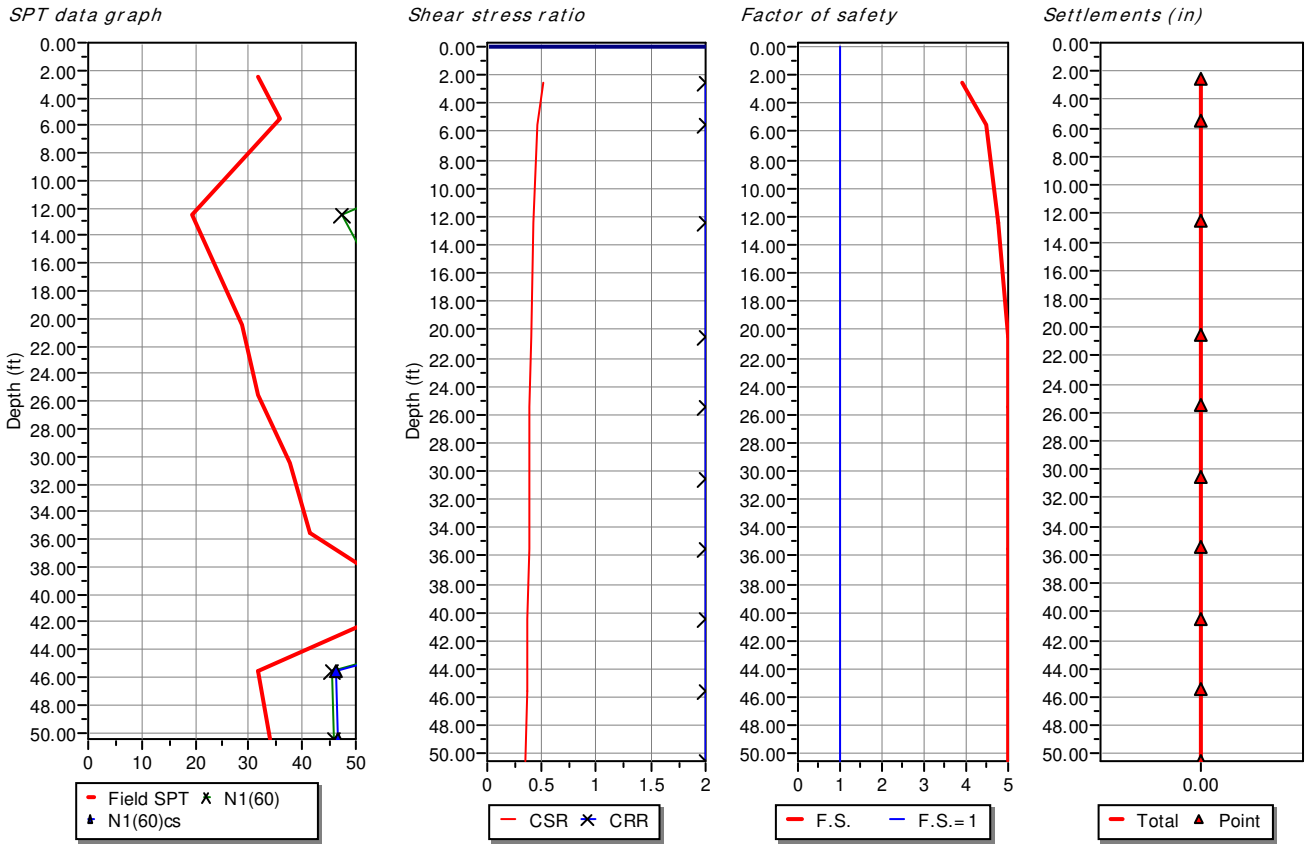
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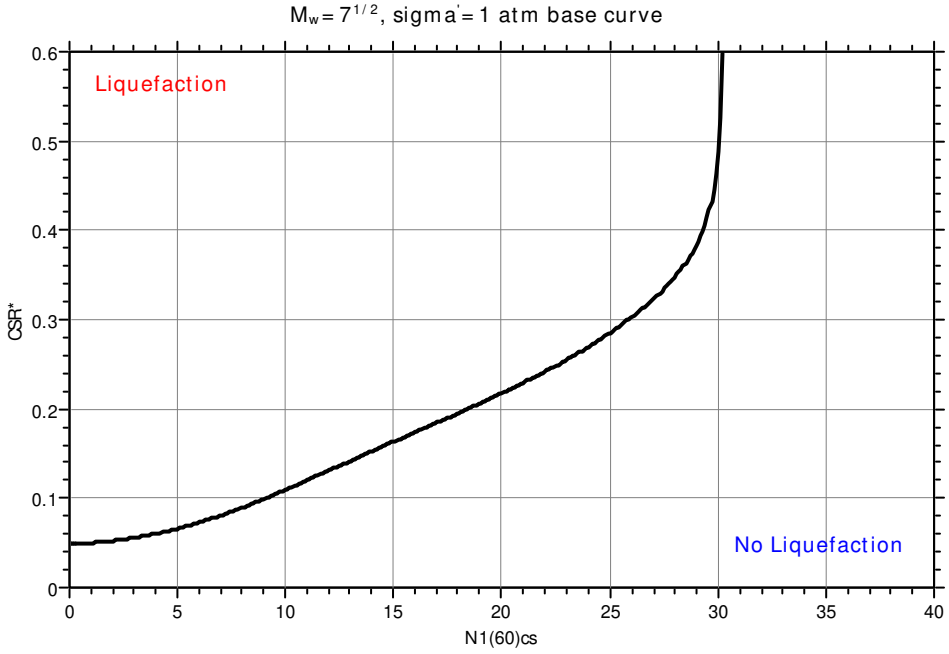
Project title : Almaden Lake Improvements

Project subtitle : LB-2

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	0.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.82
Analysis method:	NCEER 1998	Peak ground accelaration:	0.44 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.00





9

:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	2.50	31.90	111.00	60.00
2	5.50	35.80	135.00	12.00
3	12.50	19.50	135.00	19.00
4	20.50	28.60	143.00	9.00
5	25.50	31.90	143.00	8.00
6	30.50	37.70	140.00	8.00
7	35.50	41.60	140.00	8.00
8	40.50	61.10	140.00	8.00
9	45.50	31.90	140.00	8.00
10	50.50	34.00	140.00	8.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	2.50	0.14	0.08	0.06	0.99	0.65	1.28	0.51	1.00	0.51
2	5.50	0.34	0.17	0.17	0.99	0.57	1.28	0.45	1.00	0.45
3	12.50	0.81	0.39	0.42	0.97	0.53	1.28	0.42	1.00	0.42
4	20.50	1.39	0.64	0.75	0.95	0.51	1.28	0.40	1.00	0.40
5	25.50	1.74	0.80	0.95	0.94	0.50	1.28	0.39	1.00	0.39
6	30.50	2.09	0.95	1.14	0.93	0.49	1.28	0.38	0.98	0.39
7	35.50	2.44	1.11	1.33	0.89	0.46	1.28	0.36	0.95	0.38
8	40.50	2.79	1.26	1.53	0.85	0.44	1.28	0.35	0.93	0.37
9	45.50	3.14	1.42	1.72	0.80	0.42	1.28	0.33	0.90	0.36
10	50.50	3.49	1.58	1.92	0.76	0.40	1.28	0.31	0.89	0.35

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M=7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	31.90	1.70	1.45	1.05	0.75	1.20	74.31	19.86	94.17	2.00
2	35.80	1.70	1.45	1.05	0.80	1.20	88.95	4.36	93.31	2.00
3	19.50	1.57	1.45	1.05	0.85	1.20	47.55	6.90	54.45	2.00
4	28.60	1.18	1.45	1.05	0.95	1.20	58.74	1.56	60.30	2.00
5	31.90	1.05	1.45	1.05	0.95	1.20	58.14	1.03	59.17	2.00
6	37.70	0.96	1.45	1.05	1.00	1.20	65.89	1.13	67.02	2.00
7	41.60	0.88	1.45	1.05	1.00	1.20	67.22	1.15	68.37	2.00
8	61.10	0.83	1.45	1.05	1.00	1.20	92.26	1.46	93.72	2.00
9	31.90	0.78	1.45	1.05	1.00	1.20	45.38	0.87	46.25	2.00
10	34.00	0.74	1.45	1.05	1.00	1.20	45.85	0.88	46.73	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	94.17	78.48	3.92	0.00	0.00
2	93.31	77.76	4.49	0.00	0.00
3	54.45	45.37	4.78	0.00	0.00
4	60.30	50.25	5.00	0.00	0.00
5	59.17	49.31	5.00	0.00	0.00
6	67.02	55.85	5.00	0.00	0.00
7	68.37	56.97	5.00	0.00	0.00
8	93.72	78.10	5.00	0.00	0.00
9	46.25	38.54	5.00	0.00	0.00
10	46.73	38.94	5.00	0.00	0.00

Total settlement : 0.00

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.00	9.62	0.00
2	0.00	9.16	0.00
3	0.00	8.10	0.00
4	0.00	6.88	0.00
5	0.00	6.11	0.00
6	0.00	5.35	0.00
7	0.00	4.59	0.00
8	0.00	3.83	0.00
9	0.00	3.07	0.00
10	0.00	2.30	0.00

Overall potential I_L : 0.00

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

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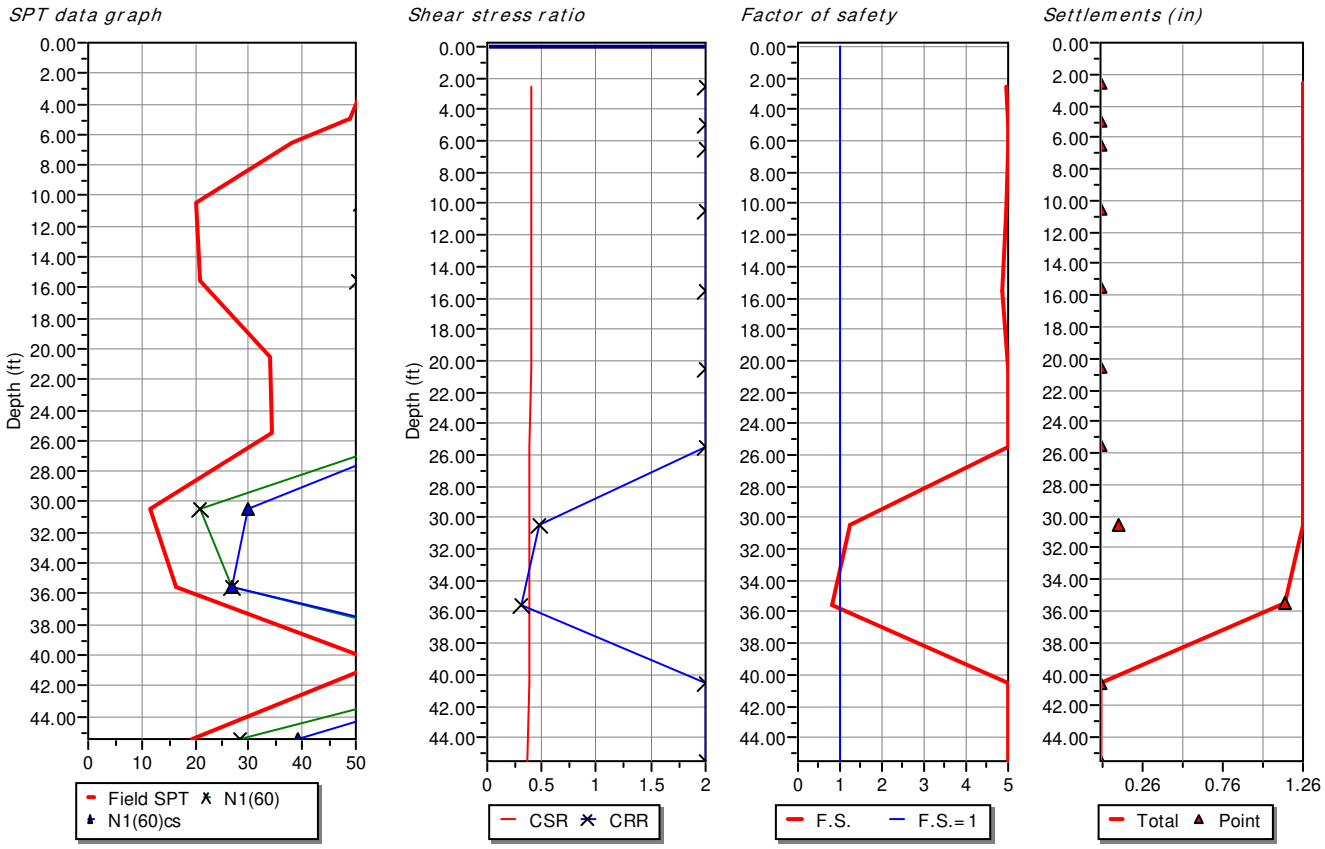
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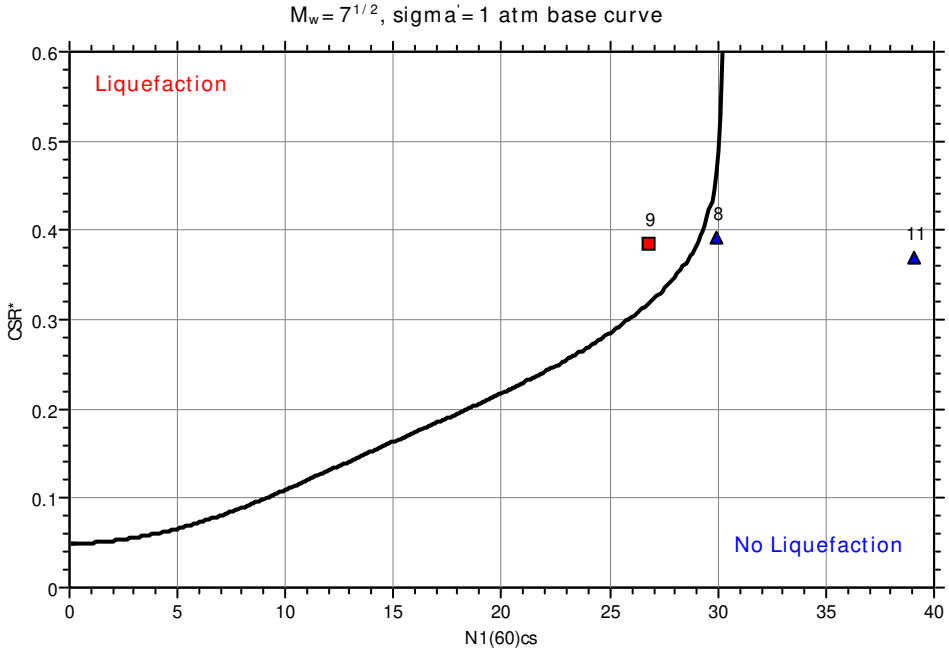
Project title : Almaden Lake Improvements

Project subtitle : LB-4

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	0.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.82
Analysis method:	NCEER 1998	Peak ground accelaration:	0.44 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.00





:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	2.50	52.00	140.00	15.00
2	5.00	48.80	140.00	15.00
3	6.50	38.00	135.00	15.00
4	10.50	20.00	130.00	11.00
5	15.50	20.80	124.00	39.00
6	20.50	33.80	139.00	15.00
7	25.50	34.50	146.00	10.00
8	30.50	11.70	128.00	64.00
9	35.50	16.30	137.00	5.00
10	40.50	54.60	140.00	10.00
11	45.50	19.50	128.00	65.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	2.50	0.18	0.08	0.10	0.99	0.51	1.28	0.40	1.00	0.40
2	5.00	0.35	0.16	0.19	0.99	0.51	1.28	0.40	1.00	0.40
3	6.50	0.45	0.20	0.25	0.98	0.51	1.28	0.40	1.00	0.40
4	10.50	0.71	0.33	0.38	0.98	0.52	1.28	0.41	1.00	0.41
5	15.50	1.02	0.48	0.54	0.96	0.52	1.28	0.41	1.00	0.41
6	20.50	1.37	0.64	0.73	0.95	0.51	1.28	0.40	1.00	0.40
7	25.50	1.73	0.80	0.94	0.94	0.50	1.28	0.39	1.00	0.39
8	30.50	2.05	0.95	1.10	0.93	0.49	1.28	0.39	0.99	0.39
9	35.50	2.40	1.11	1.29	0.89	0.47	1.28	0.37	0.96	0.39
10	40.50	2.75	1.26	1.48	0.85	0.45	1.28	0.35	0.93	0.38
11	45.50	3.07	1.42	1.65	0.80	0.43	1.28	0.34	0.91	0.37

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M= 7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	52.00	1.70	1.45	1.05	0.75	1.20	121.13	8.32	129.45	2.00
2	48.80	1.70	1.45	1.05	0.80	1.20	121.25	8.33	129.58	2.00
3	38.00	1.70	1.45	1.05	0.80	1.20	94.42	7.04	101.46	2.00
4	20.00	1.65	1.45	1.05	0.85	1.20	51.26	2.57	53.82	2.00
5	20.80	1.39	1.45	1.05	0.95	1.20	50.33	15.07	65.39	2.00
6	33.80	1.20	1.45	1.05	0.95	1.20	70.23	5.88	76.10	2.00
7	34.50	1.06	1.45	1.05	0.95	1.20	63.19	2.24	65.43	2.00
8	11.70	0.97	1.45	1.05	1.00	1.20	20.81	9.16	29.98	0.48
9	16.30	0.90	1.45	1.05	1.00	1.20	26.82	0.00	26.82	0.32
10	54.60	0.84	1.45	1.05	1.00	1.20	83.74	2.68	86.42	2.00
11	19.50	0.80	1.45	1.05	1.00	1.20	28.38	10.68	39.05	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	129.45	107.88	4.97	0.00	0.00
2	129.58	107.99	5.00	0.00	0.00
3	101.46	84.55	4.98	0.00	0.00
4	53.82	44.85	4.93	0.00	0.00
5	65.39	54.49	4.87	0.00	0.00
6	76.10	63.42	4.99	0.00	0.00
7	65.43	54.52	5.00	0.00	0.00
8	29.98	24.98	1.23	0.19	0.11
9	26.82	22.35	0.83	1.92	1.15
10	86.42	72.02	5.00	0.00	0.00
11	39.05	32.55	5.00	0.00	0.00

Total settlement : 1.26

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.00	9.62	0.00
2	0.00	9.24	0.00
3	0.00	9.01	0.00
4	0.00	8.40	0.00
5	0.00	7.64	0.00
6	0.00	6.88	0.00
7	0.00	6.11	0.00
8	0.00	5.35	0.00
9	0.17	4.59	1.21
10	0.00	3.83	0.00
11	0.00	3.07	0.00

Overall potential I_L : 1.21

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

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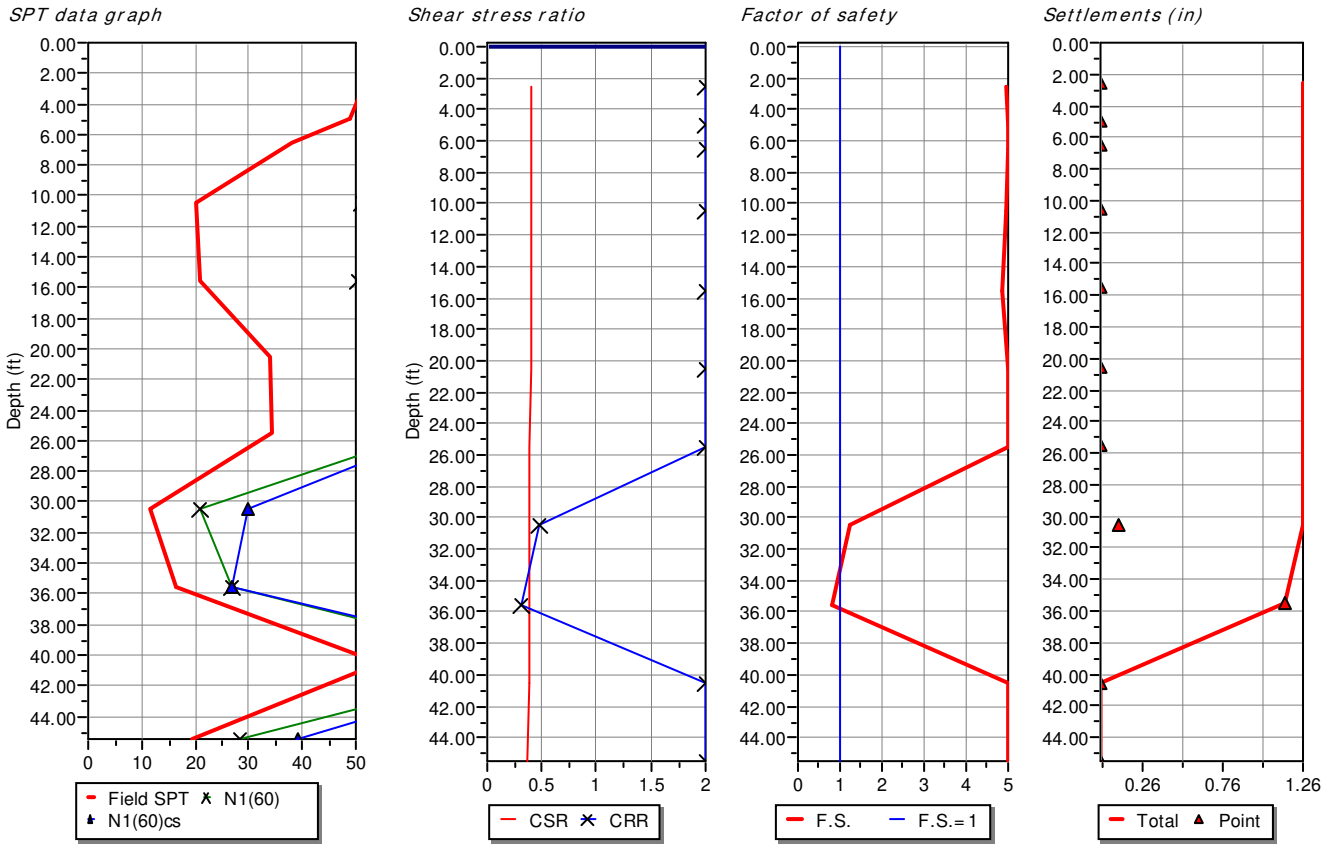
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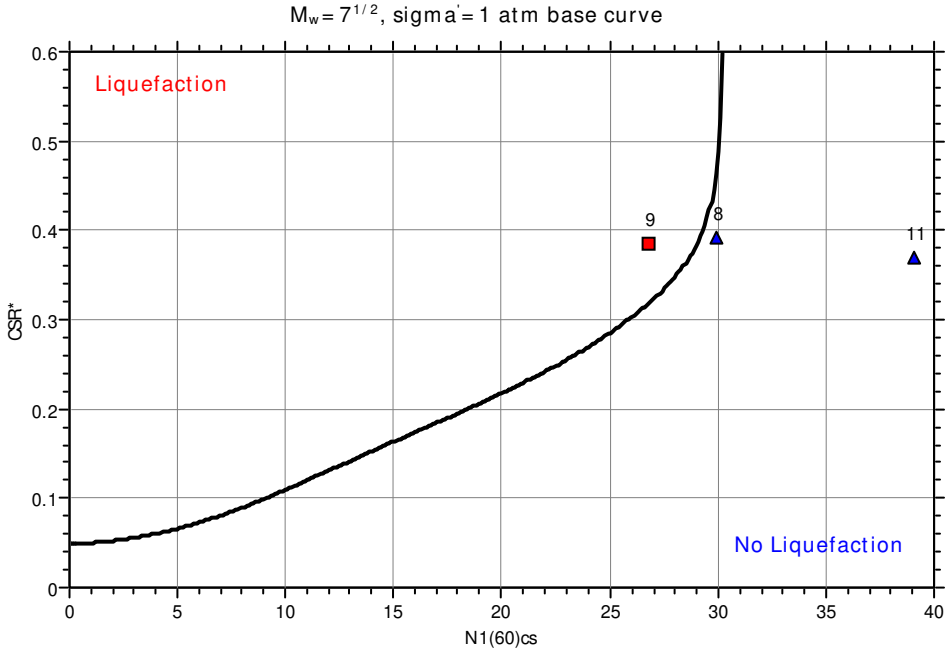
Project title : Almaden Lake Improvements

Project subtitle : LB-4

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	0.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.82
Analysis method:	NCEER 1998	Peak ground accelaration:	0.44 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.00





:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	2.50	52.00	140.00	15.00
2	5.00	48.80	140.00	15.00
3	6.50	38.00	135.00	15.00
4	10.50	20.00	130.00	11.00
5	15.50	20.80	124.00	39.00
6	20.50	33.80	139.00	15.00
7	25.50	34.50	146.00	10.00
8	30.50	11.70	128.00	64.00
9	35.50	16.30	137.00	5.00
10	40.50	54.60	140.00	10.00
11	45.50	19.50	128.00	65.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	2.50	0.18	0.08	0.10	0.99	0.51	1.28	0.40	1.00	0.40
2	5.00	0.35	0.16	0.19	0.99	0.51	1.28	0.40	1.00	0.40
3	6.50	0.45	0.20	0.25	0.98	0.51	1.28	0.40	1.00	0.40
4	10.50	0.71	0.33	0.38	0.98	0.52	1.28	0.41	1.00	0.41
5	15.50	1.02	0.48	0.54	0.96	0.52	1.28	0.41	1.00	0.41
6	20.50	1.37	0.64	0.73	0.95	0.51	1.28	0.40	1.00	0.40
7	25.50	1.73	0.80	0.94	0.94	0.50	1.28	0.39	1.00	0.39
8	30.50	2.05	0.95	1.10	0.93	0.49	1.28	0.39	0.99	0.39
9	35.50	2.40	1.11	1.29	0.89	0.47	1.28	0.37	0.96	0.39
10	40.50	2.75	1.26	1.48	0.85	0.45	1.28	0.35	0.93	0.38
11	45.50	3.07	1.42	1.65	0.80	0.43	1.28	0.34	0.91	0.37

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M= 7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	52.00	1.70	1.45	1.05	0.75	1.20	121.13	8.32	129.45	2.00
2	48.80	1.70	1.45	1.05	0.80	1.20	121.25	8.33	129.58	2.00
3	38.00	1.70	1.45	1.05	0.80	1.20	94.42	7.04	101.46	2.00
4	20.00	1.65	1.45	1.05	0.85	1.20	51.26	2.57	53.82	2.00
5	20.80	1.39	1.45	1.05	0.95	1.20	50.33	15.07	65.39	2.00
6	33.80	1.20	1.45	1.05	0.95	1.20	70.23	5.88	76.10	2.00
7	34.50	1.06	1.45	1.05	0.95	1.20	63.19	2.24	65.43	2.00
8	11.70	0.97	1.45	1.05	1.00	1.20	20.81	9.16	29.98	0.48
9	16.30	0.90	1.45	1.05	1.00	1.20	26.82	0.00	26.82	0.32
10	54.60	0.84	1.45	1.05	1.00	1.20	83.74	2.68	86.42	2.00
11	19.50	0.80	1.45	1.05	1.00	1.20	28.38	10.68	39.05	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	129.45	107.88	4.97	0.00	0.00
2	129.58	107.99	5.00	0.00	0.00
3	101.46	84.55	4.98	0.00	0.00
4	53.82	44.85	4.93	0.00	0.00
5	65.39	54.49	4.87	0.00	0.00
6	76.10	63.42	4.99	0.00	0.00
7	65.43	54.52	5.00	0.00	0.00
8	29.98	24.98	1.23	0.19	0.11
9	26.82	22.35	0.83	1.92	1.15
10	86.42	72.02	5.00	0.00	0.00
11	39.05	32.55	5.00	0.00	0.00

Total settlement : 1.26

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.00	9.62	0.00
2	0.00	9.24	0.00
3	0.00	9.01	0.00
4	0.00	8.40	0.00
5	0.00	7.64	0.00
6	0.00	6.88	0.00
7	0.00	6.11	0.00
8	0.00	5.35	0.00
9	0.17	4.59	1.21
10	0.00	3.83	0.00
11	0.00	3.07	0.00

Overall potential I_L : 1.21

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

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San Jose, CA 408.440.4542

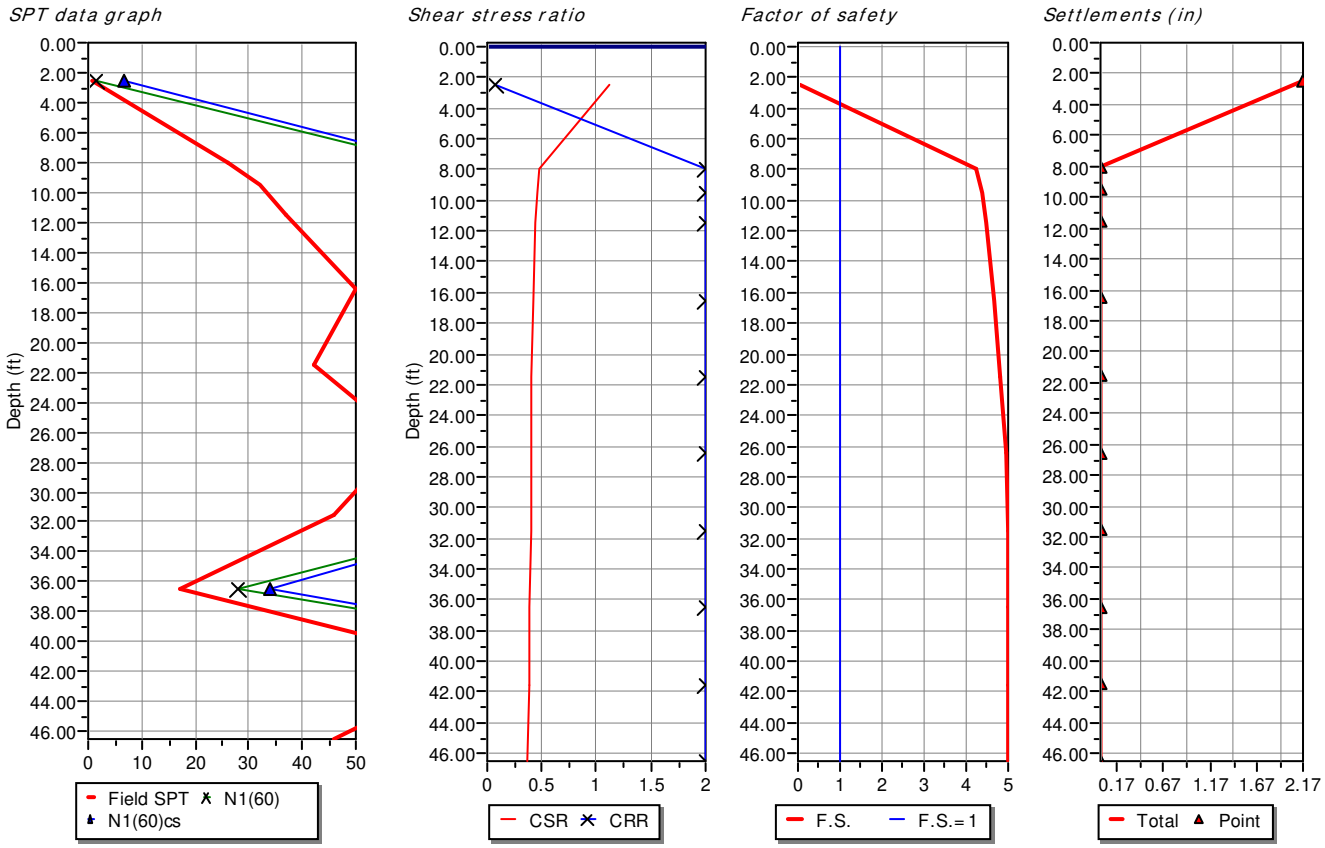
LIQUEFACTION ANALYSIS REPORT

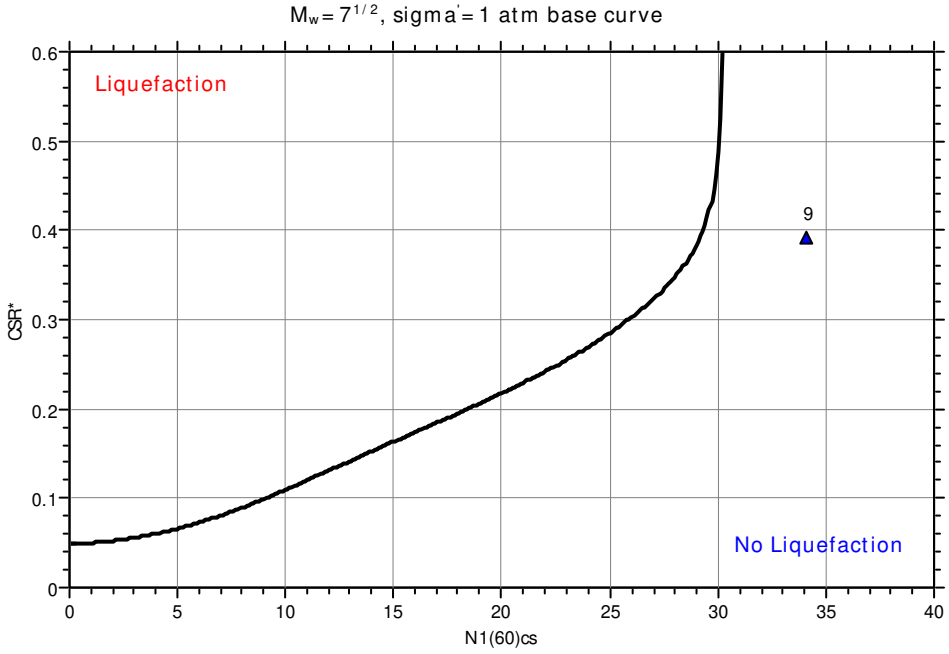
Project title : Almaden Lake Improvements

Project subtitle : WB-1

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	0.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.82
Analysis method:	NCEER 1998	Peak ground accelaration:	0.44 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.00





:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	2.50	0.65	78.00	80.00
2	8.00	26.00	135.00	10.00
3	9.50	32.00	135.00	11.00
4	11.50	37.00	135.00	9.00
5	16.50	50.00	135.00	9.00
6	21.50	42.00	135.00	13.00
7	26.50	59.00	135.00	7.00
8	31.50	46.00	135.00	7.00
9	36.50	17.00	130.00	21.00
10	41.50	74.00	135.00	7.00
11	46.50	46.00	135.00	7.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	2.50	0.10	0.08	0.02	0.99	1.43	1.28	1.12	1.00	1.12
2	8.00	0.47	0.25	0.22	0.98	0.60	1.28	0.47	1.00	0.47
3	9.50	0.57	0.30	0.27	0.98	0.58	1.28	0.46	1.00	0.46
4	11.50	0.71	0.36	0.35	0.97	0.57	1.28	0.44	1.00	0.44
5	16.50	1.04	0.52	0.53	0.96	0.54	1.28	0.43	1.00	0.43
6	21.50	1.38	0.67	0.71	0.95	0.53	1.28	0.41	1.00	0.41
7	26.50	1.72	0.83	0.89	0.94	0.52	1.28	0.41	1.00	0.41
8	31.50	2.06	0.98	1.07	0.92	0.50	1.28	0.40	0.99	0.40
9	36.50	2.38	1.14	1.24	0.88	0.48	1.28	0.38	0.97	0.39
10	41.50	2.72	1.30	1.42	0.84	0.46	1.28	0.36	0.94	0.38
11	46.50	3.06	1.45	1.60	0.80	0.43	1.28	0.34	0.92	0.37

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M= 7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	0.65	1.70	1.42	1.05	0.75	1.20	1.48	5.30	6.78	0.08
2	26.00	1.70	1.42	1.05	0.80	1.20	63.27	2.24	65.50	2.00
3	32.00	1.70	1.42	1.05	0.85	1.20	82.73	3.40	86.13	2.00
4	37.00	1.70	1.42	1.05	0.85	1.20	95.66	2.18	97.84	2.00
5	50.00	1.41	1.42	1.05	0.95	1.20	119.59	2.59	122.18	2.00
6	42.00	1.21	1.42	1.05	0.95	1.20	86.65	5.08	91.74	2.00
7	59.00	1.08	1.42	1.05	0.95	1.20	108.62	1.05	109.66	2.00
8	46.00	0.99	1.42	1.05	1.00	1.20	81.25	0.81	82.06	2.00
9	17.00	0.92	1.42	1.05	1.00	1.20	27.91	6.18	34.09	2.00
10	74.00	0.86	1.42	1.05	1.00	1.20	113.47	1.09	114.55	2.00
11	46.00	0.81	1.42	1.05	1.00	1.20	66.42	0.69	67.11	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	6.78	5.65	0.07	4.53	2.17
2	65.50	54.59	4.24	0.00	0.00
3	86.13	71.78	4.37	0.00	0.00
4	97.84	81.54	4.50	0.00	0.00
5	122.18	101.82	4.69	0.00	0.00
6	91.74	76.45	4.82	0.00	0.00
7	109.66	91.39	4.93	0.00	0.00
8	82.06	68.38	5.00	0.00	0.00
9	34.09	28.41	5.00	0.00	0.00
10	114.55	95.46	5.00	0.00	0.00
11	67.11	55.92	5.00	0.00	0.00

Total settlement : 2.17

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.93	9.62	6.81
2	0.00	8.78	0.00
3	0.00	8.55	0.00
4	0.00	8.25	0.00
5	0.00	7.49	0.00
6	0.00	6.72	0.00
7	0.00	5.96	0.00
8	0.00	5.20	0.00
9	0.00	4.44	0.00
10	0.00	3.68	0.00
11	0.00	2.91	0.00

Overall potential I_L : 6.81

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

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San Jose, CA 408.440.4542

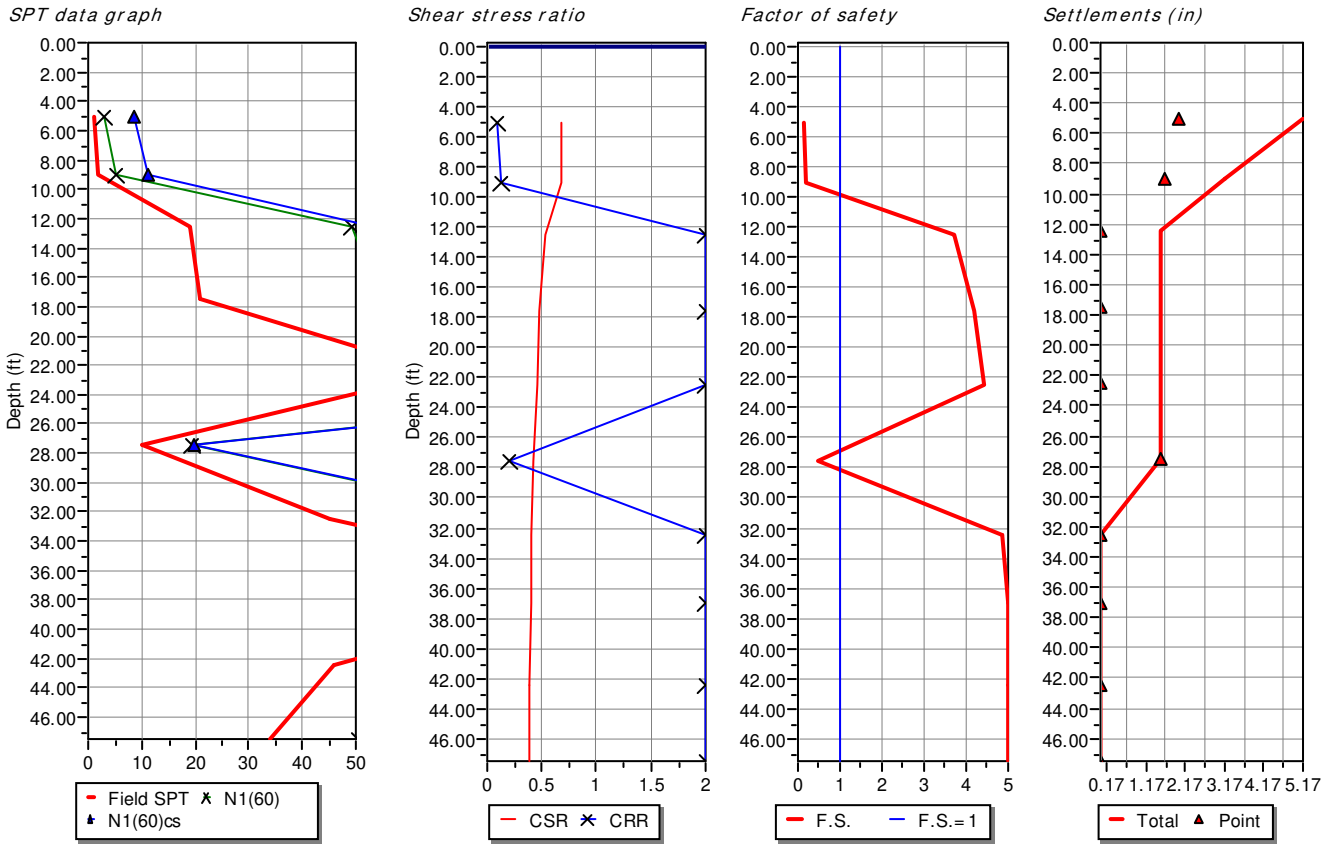
LIQUEFACTION ANALYSIS REPORT

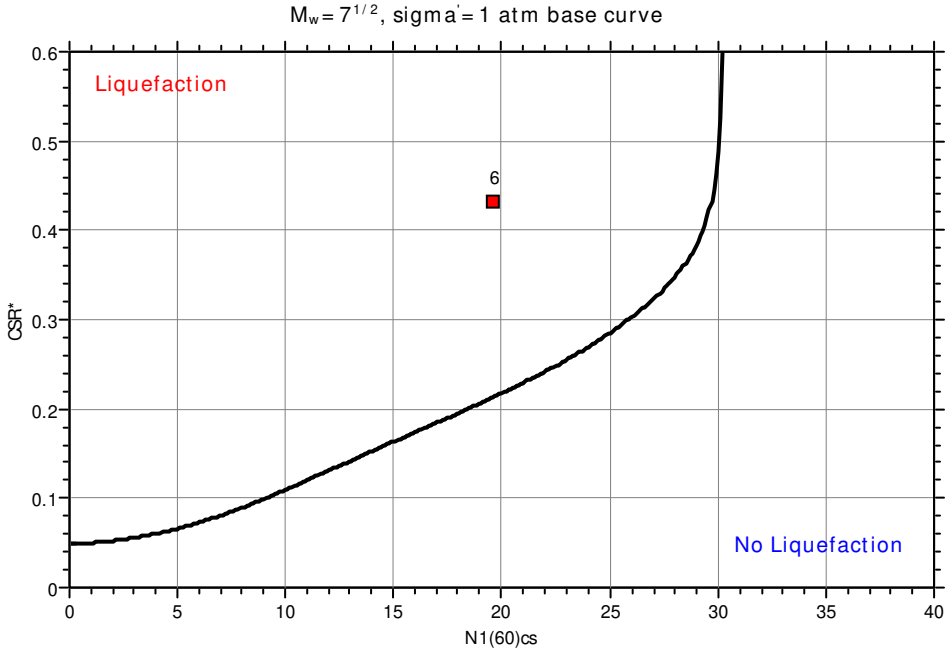
Project title : Almaden Lake Improvements

Project subtitle : WB-2

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	0.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.82
Analysis method:	NCEER 1998	Peak ground accelaration:	0.44 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.00





:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	5.00	1.25	93.00	42.00
2	9.00	1.95	93.00	90.00
3	12.50	19.00	135.00	14.00
4	17.50	21.00	135.00	22.00
5	22.50	66.00	135.00	6.00
6	27.50	10.00	135.00	7.00
7	32.50	45.00	135.00	7.00
8	37.00	100.00	135.00	7.00
9	42.50	46.00	135.00	9.00
10	47.50	34.00	135.00	10.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	5.00	0.23	0.16	0.08	0.99	0.86	1.28	0.67	1.00	0.67
2	9.00	0.42	0.28	0.14	0.98	0.85	1.28	0.67	1.00	0.67
3	12.50	0.65	0.39	0.26	0.97	0.69	1.28	0.54	1.00	0.54
4	17.50	0.99	0.55	0.45	0.96	0.61	1.28	0.48	1.00	0.48
5	22.50	1.33	0.70	0.63	0.95	0.57	1.28	0.45	1.00	0.45
6	27.50	1.67	0.86	0.81	0.94	0.55	1.28	0.43	1.00	0.43
7	32.50	2.00	1.01	0.99	0.91	0.53	1.28	0.41	1.00	0.41
8	37.00	2.31	1.16	1.15	0.87	0.50	1.28	0.39	0.98	0.40
9	42.50	2.68	1.33	1.35	0.83	0.47	1.28	0.37	0.95	0.39
10	47.50	3.02	1.48	1.53	0.79	0.44	1.28	0.35	0.93	0.38

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M=7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	1.25	1.70	1.42	1.05	0.80	1.20	3.04	5.61	8.65	0.10
2	1.95	1.70	1.42	1.05	0.85	1.20	5.04	6.01	11.05	0.12
3	19.00	1.70	1.42	1.05	0.85	1.20	49.12	4.29	53.41	2.00
4	21.00	1.53	1.42	1.05	0.95	1.20	54.63	9.02	63.64	2.00
5	66.00	1.29	1.42	1.05	0.95	1.20	144.74	0.71	145.45	2.00
6	10.00	1.14	1.42	1.05	0.95	1.20	19.32	0.28	19.60	0.21
7	45.00	1.03	1.42	1.05	1.00	1.20	82.69	0.82	83.51	2.00
8	100.00	0.95	1.42	1.05	1.00	1.20	170.25	1.57	171.82	2.00
9	46.00	0.88	1.42	1.05	1.00	1.20	72.31	1.79	74.09	2.00
10	34.00	0.82	1.42	1.05	1.00	1.20	50.19	1.95	52.14	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	8.65	7.21	0.14	4.13	1.98
2	11.05	9.21	0.18	3.68	1.66
3	53.41	44.51	3.71	0.00	0.00
4	63.64	53.03	4.18	0.00	0.00
5	145.45	121.21	4.44	0.00	0.00
6	19.60	16.33	0.49	2.55	1.53
7	83.51	69.59	4.84	0.00	0.00
8	171.82	143.18	5.00	0.00	0.00
9	74.09	61.75	5.00	0.00	0.00
10	52.14	43.45	5.00	0.00	0.00

Total settlement : 5.17

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.86	9.24	12.08
2	0.82	8.63	8.62
3	0.00	8.10	0.00
4	0.00	7.33	0.00
5	0.00	6.57	0.00
6	0.51	5.81	4.49
7	0.00	5.05	0.00
8	0.00	4.36	0.00
9	0.00	3.52	0.00
10	0.00	2.76	0.00

Overall potential I_L : 25.19

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

APPENDIX D

Seepage Evaluation

CE&G
CAL ENGINEERING & GEOLOGY

DOCUMENT REVIEW COVER SHEET

1. PROJECT NAME	2. PROJECT NUMBER
Almaden Lake Improvement Project	140540

3. DOCUMENT TITLE
Appendix D Seepage Analysis

4. DOCUMENT STATUS DESIGNATION
☐ Preliminary ☒ Final ☐ Cancelled

5. NOTES/COMMENTS
The purpose of this calculation is to perform a steady state seepage analysis assuming the 100-year flood condition to detemine the critical exit gradient is in conformance with USACE guidelines (USACE, 2000).

ATTACHMENTS	TOTAL NO. OF PAGES
Seepage Analysis for Alternative 6 station 2+50 section	2
Seepage Analysis for Alternative 7 station 10+00 section	2
Seepage Analysis For Alternative 7 Station 12+00 Section	2

RECORD OF REVISIONS

6. NO.	7. REASON FOR REVISION	8. TOT. PGS	10. ORIGINATOR (PRINT/SIGN/DATE)	11. CHECKER (PRINT/SIGN/DATE)	12. QA/QC (PRINT/SIGN/DATE)	13. APPRVD./ACCPTD (PRINT/SIGN)	14. DATE (M/D/YY)
1	Final Issue	6	Eli Zane	Dan Peluso	Dan Peluso	Dan Peluso	4/30/15

Almaden Lake Improvements Project
Alternative 6 Station 2+50
Steady Seepage HWSE on Creek Side
Exit Gradient at Toe = 0.38

Name: Levee Fill
Model: Saturated / Unsaturated
K-Function: Levee Fill
Ky'/Kx' Ratio: 0.25

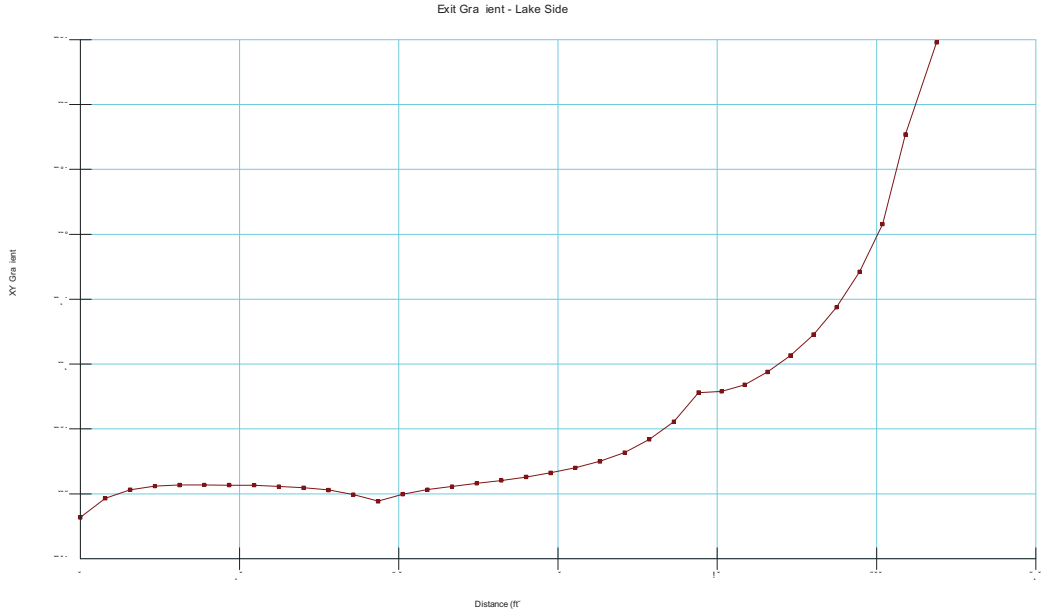
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Model: Saturated / Unsaturated
K-Function: Clay Cap
Ky'/Kx' Ratio: 0.25

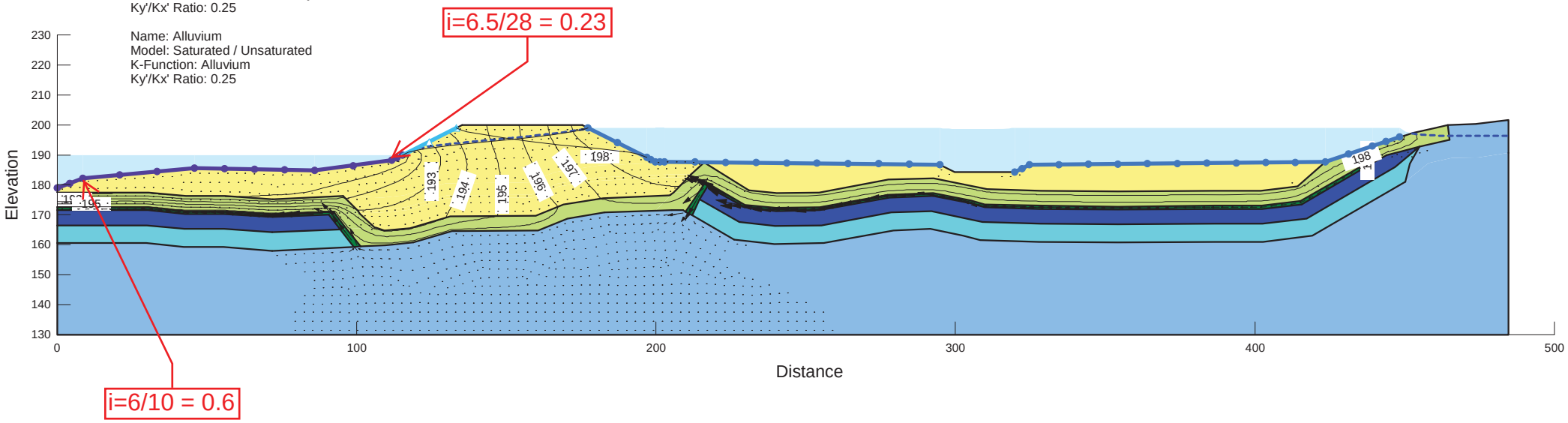
Name: Class 2 AB
Model: Saturated / Unsaturated
K-Function: Class 2 AB
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 2
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 2
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 1
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 1
Ky'/Kx' Ratio: 0.25

Name: Alluvium
Model: Saturated / Unsaturated
K-Function: Alluvium
Ky'/Kx' Ratio: 0.25





Almaden Lake Improvements Project
Alternative 6 Station 2+50
Steady Seepage HWSE on Lake Side
Exit Gradient at Toe = 0.12

Name: Levee Fill
Model: Saturated / Unsaturated
K-Function: Levee Fill
Ky'/Kx' Ratio: 0.25

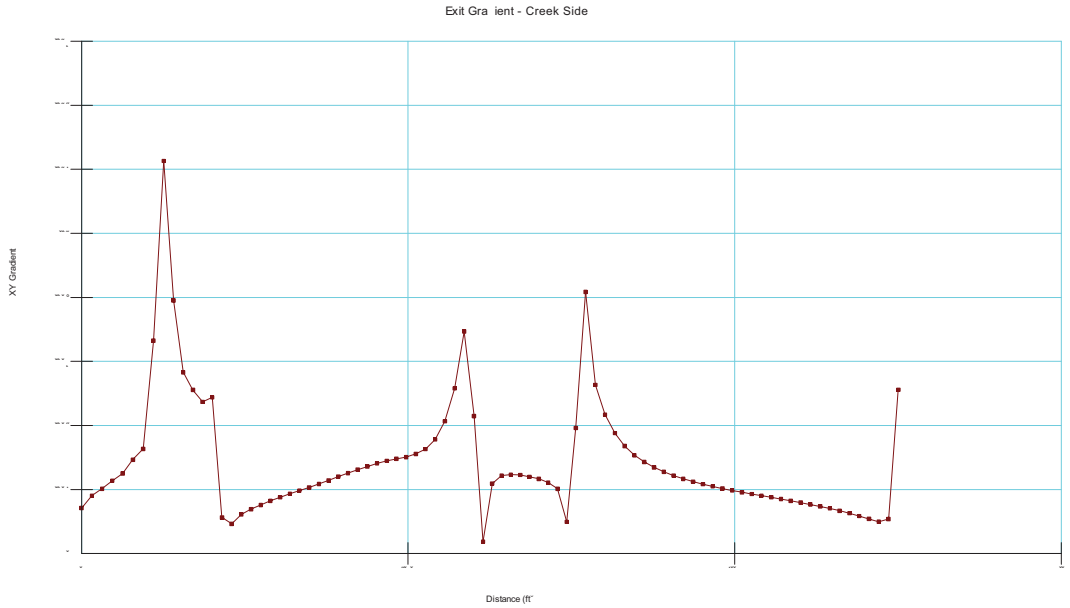
Name: Clay Cap
Model: Saturated / Unsaturated
K-Function: Clay Cap
Ky'/Kx' Ratio: 0.25

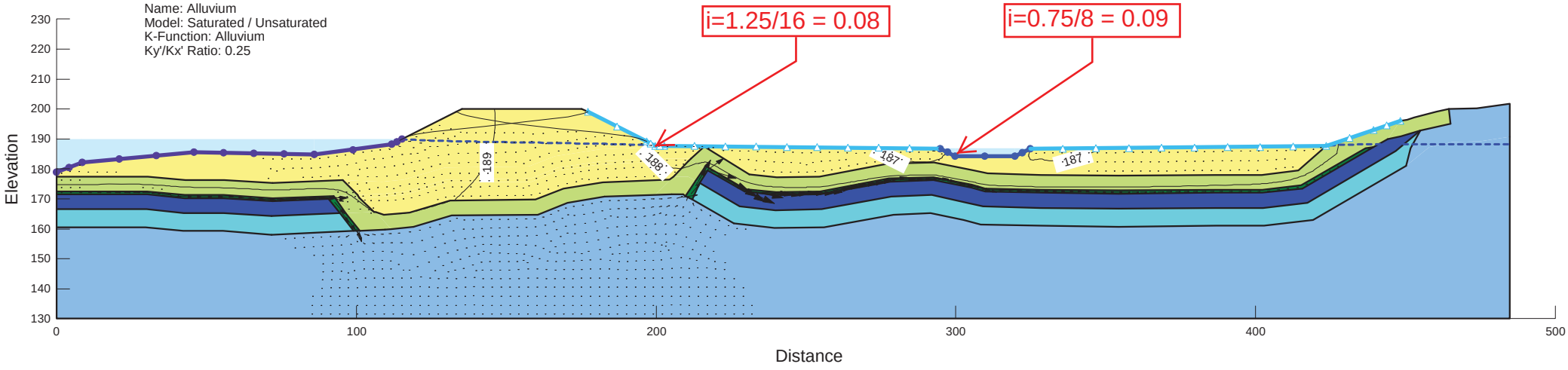
Name: Class 2 AB
Model: Saturated / Unsaturated
K-Function: Class 2 AB
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 2
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 2
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 1
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 1
Ky'/Kx' Ratio: 0.25

Name: Alluvium
Model: Saturated / Unsaturated
K-Function: Alluvium
Ky'/Kx' Ratio: 0.25





Almaden Lake Improvements Project
Alternative 7 Station 10+00
Steady Seepage HWSE on Creek Side
Exit Gradient at Toe = 0.42

Name: Levee Fill
Model: Saturated / Unsaturated
K-Function: Levee Fill
Ky'/Kx' Ratio: 0.25

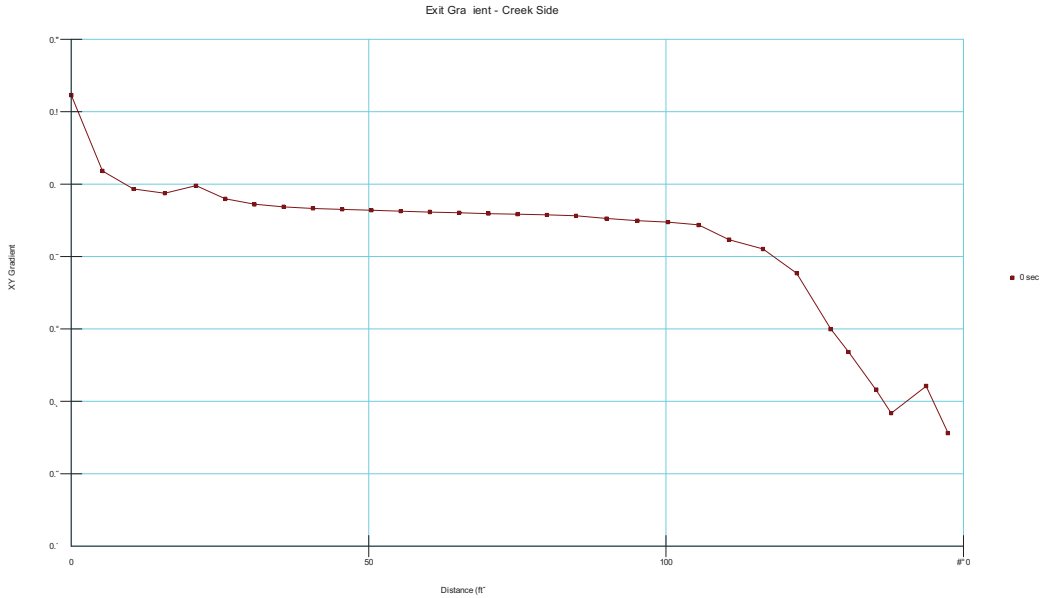
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Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 2
Ky'/Kx' Ratio: 0.25

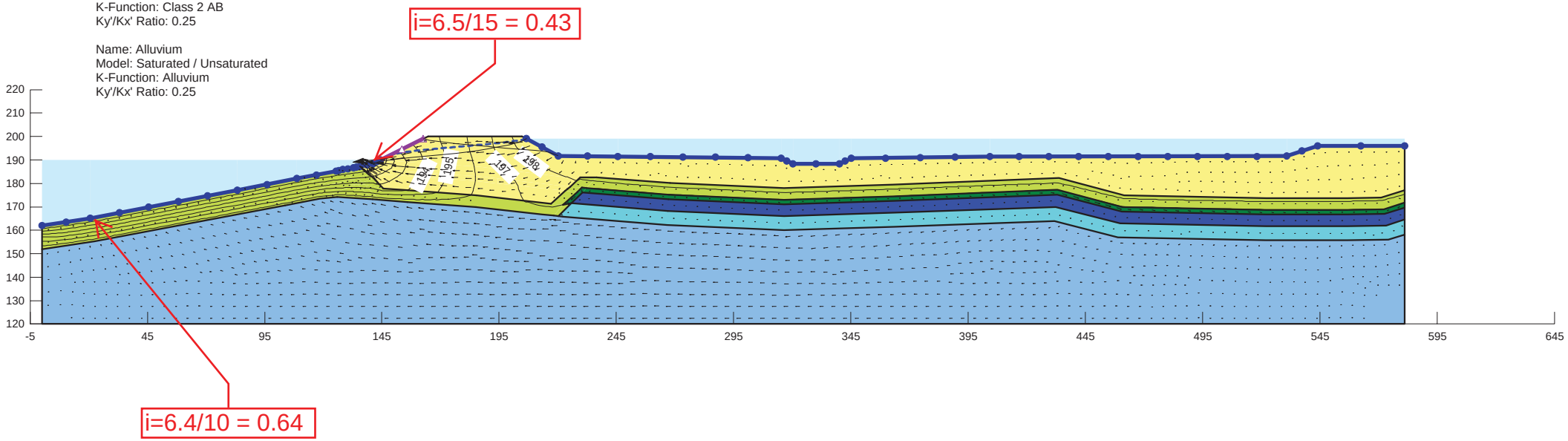
Name: Lake Sediment Layer 1
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 1
Ky'/Kx' Ratio: 0.25

Name: Clay Cap
Model: Saturated / Unsaturated
K-Function: Clay Cap
Ky'/Kx' Ratio: 0.25

Name: Class 2 AB
Model: Saturated / Unsaturated
K-Function: Class 2 AB
Ky'/Kx' Ratio: 0.25

Name: Alluvium
Model: Saturated / Unsaturated
K-Function: Alluvium
Ky'/Kx' Ratio: 0.25





Alternative 7 Station 10+00
Steady Seepage HWSE on Lake Side
Exit Gradient at Toe = 0.01

Name: Levee Fill
Model: Saturated / Unsaturated
K-Function: Levee Fill
Ky'/Kx' Ratio: 0.25

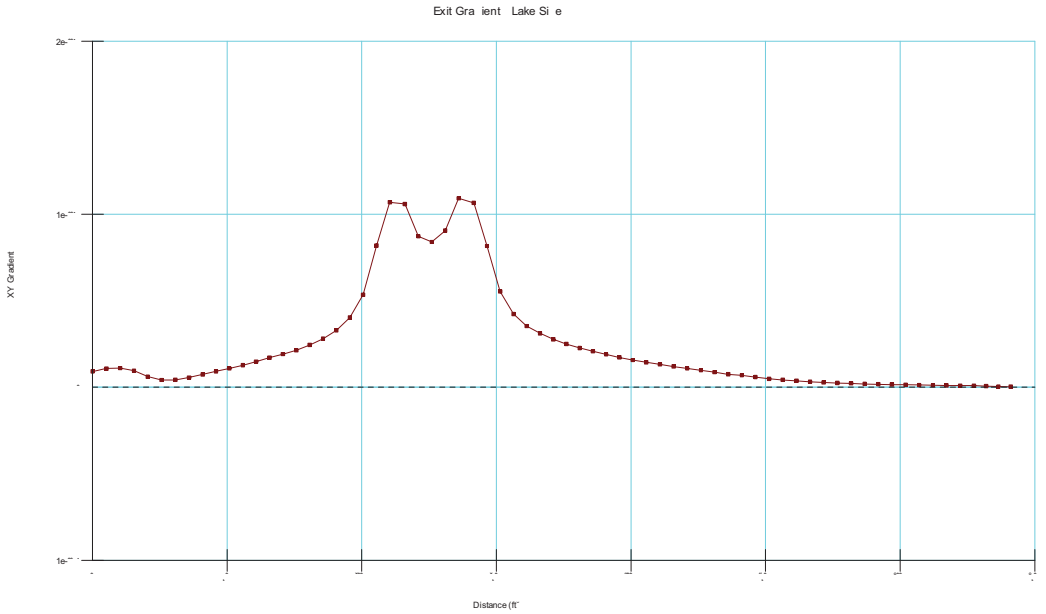
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Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 2
Ky'/Kx' Ratio: 0.25

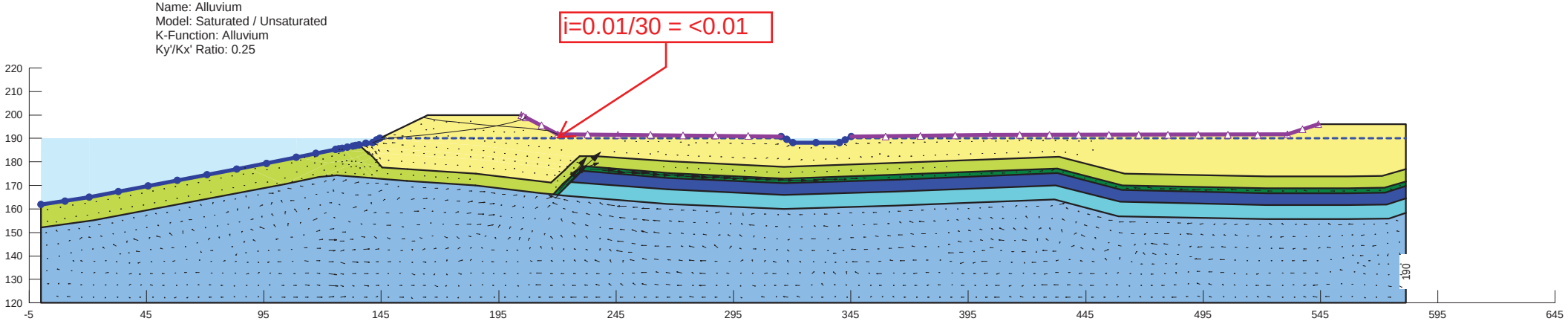
Name: Lake Sediment Layer 1
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 1
Ky'/Kx' Ratio: 0.25

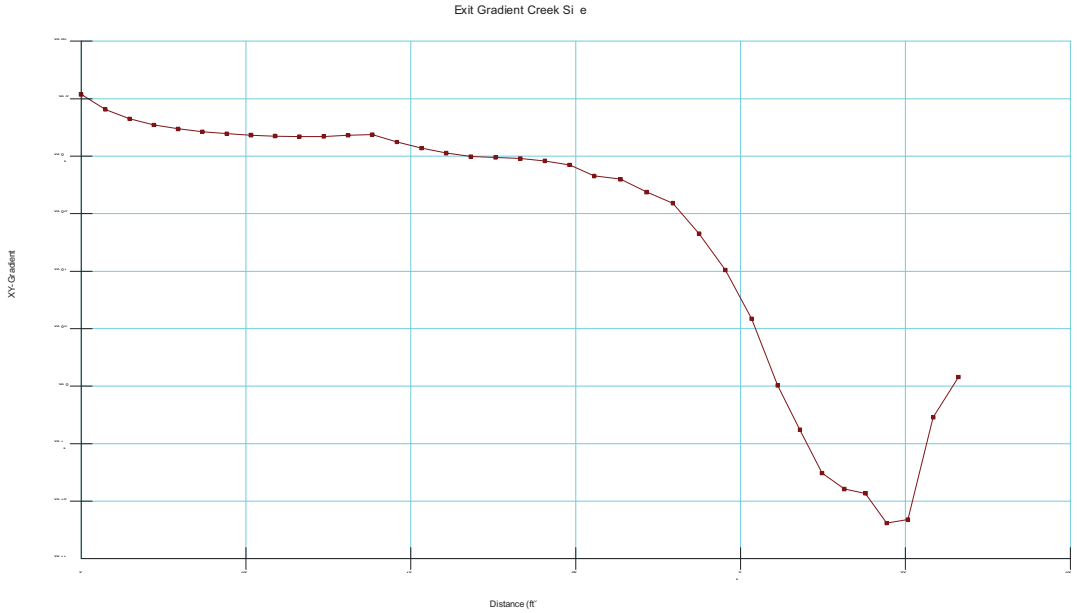
Name: Clay Cap
Model: Saturated / Unsaturated
K-Function: Clay Cap
Ky'/Kx' Ratio: 0.25

Name: Class 2 AB
Model: Saturated / Unsaturated
K-Function: Class 2 AB
Ky'/Kx' Ratio: 0.25

Name: Alluvium
Model: Saturated / Unsaturated
K-Function: Alluvium
Ky'/Kx' Ratio: 0.25







Almaden Lake Improvements Project
Alternative 7 Station 12+00
Steady Seepage HWSE on Creek Side
Exit Gradient at Toe = 0.49

Name: Levee Fill
Model: Saturated / Unsaturated
K-Function: Levee Fill
Ky'/Kx' Ratio: 0.25

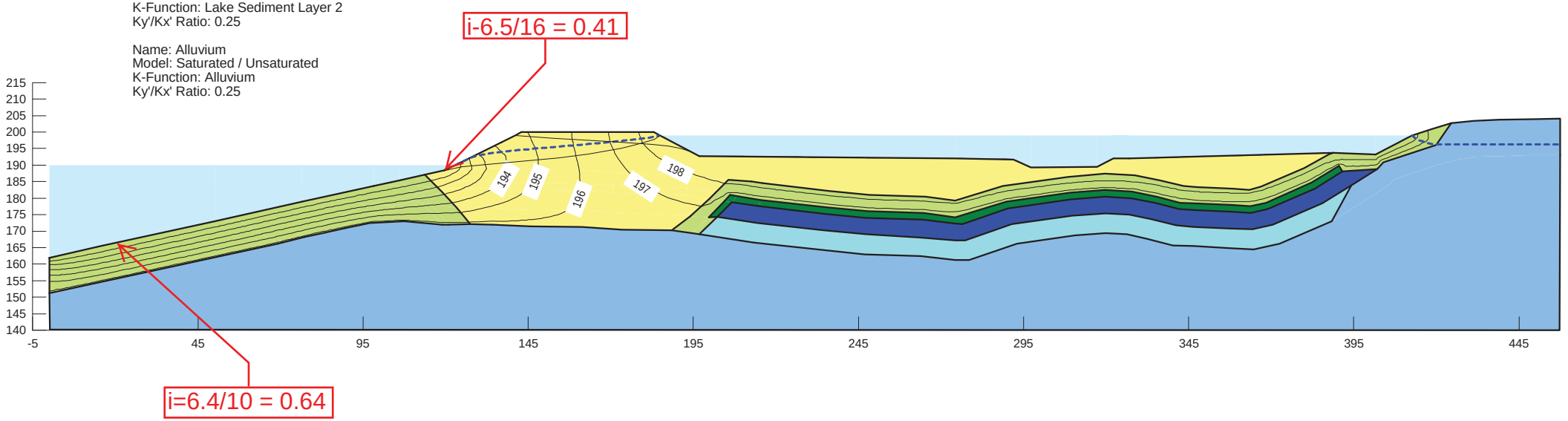
Name: Clay Cap
Model: Saturated / Unsaturated
K-Function: Clay Cap
Ky'/Kx' Ratio: 0.25

Name: Aggregate Base
Model: Saturated / Unsaturated
K-Function: Class 2 AB
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 1
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 1
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 2
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 2
Ky'/Kx' Ratio: 0.25

Name: Alluvium
Model: Saturated / Unsaturated
K-Function: Alluvium
Ky'/Kx' Ratio: 0.25



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Steady Seepage H! SE on Lake Side
"# it Gradient at Toe = 0.01

Name: Levee Fill
+ odel: Saturated / Unsaturated
K-Function: Levee Fill
/° 1-/# Ratio: 0.25

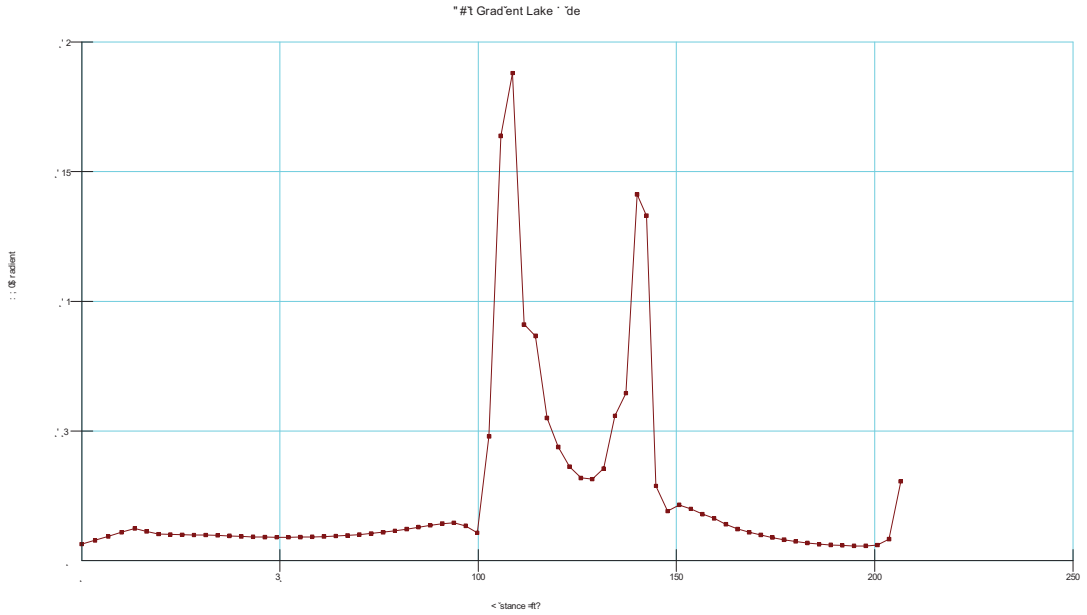
Name: Clay Cap
+ odel: Saturated / Unsaturated
K-Function: Clay Cap
/° 1-/# Ratio: 0.25

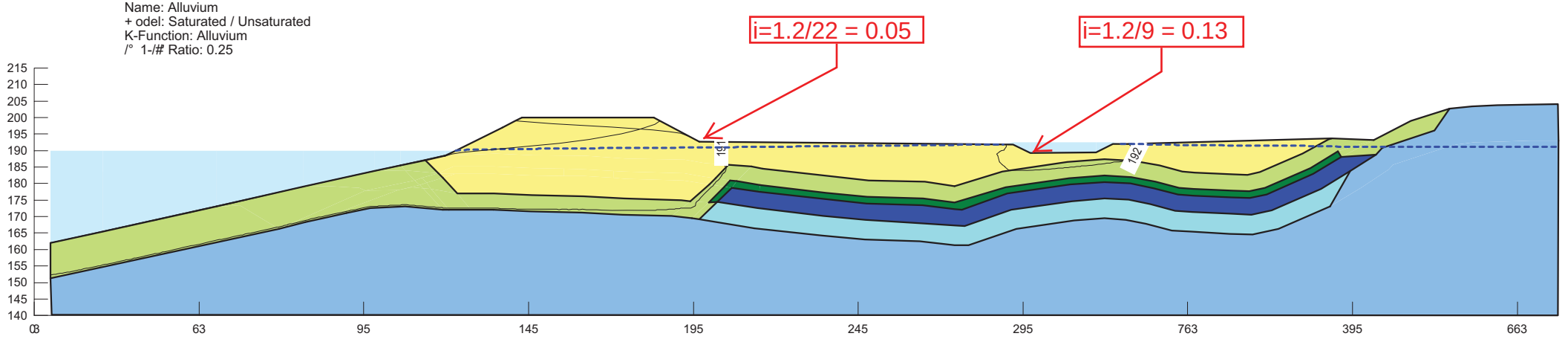
Name: Aggregate Base
+ odel: Saturated / Unsaturated
K-Function: Class 2 AB
/° 1-/# Ratio: 0.25

Name: Lake Sediment Layer 1
+ odel: Saturated / Unsaturated
K-Function: Lake Sediment Layer 1
/° 1-/# Ratio: 0.25

Name: Lake Sediment Layer 2
+ odel: Saturated / Unsaturated
K-Function: Lake Sediment Layer 2
/° 1-/# Ratio: 0.25

Name: Alluvium
+ odel: Saturated / Unsaturated
K-Function: Alluvium
/° 1-/# Ratio: 0.25





APPENDIX E

Slope Stability Calculations

CE&G
CAL ENGINEERING & GEOLOGY

DOCUMENT REVIEW COVER SHEET

1. PROJECT NAME	2. PROJECT NUMBER
Almaden Lake Improvement Project	140540

3. DOCUMENT TITLE
Appendix E Slope Stability

4. DOCUMENT STATUS DESIGNATION
☐ Preliminary ☒ Final ☐ Cancelled

5. NOTES/COMMENTS
The purpose of this calculation is to perform slope stability analysis in conformance with USACE guidelines (USACE, 2000) for static conditions, end-of-construction condition, steady state seepage condition, rapid drawdown condition, and earthquake loading condition.

ATTACHMENTS	TOTAL NO. OF PAGES
USGS seismic deaggregation and SP117 analysis	2
Alternative 6 Station 2+50 Cross Section Stability Analysis Results	14
Alternative 6 Station 7+00 Cross Section Stability Analysis Results	3
Alternative 7 Station 10+00 Cross Section Stability Analysis Results	14
Alternative 7 Station 12+00 Cross Section Stability Analysis Results	14

RECORD OF REVISIONS

6. NO.	7. REASON FOR REVISION	8. TOT. PGS	10. ORIGINATOR (PRINT/SIGN/DATE)	11. CHECKER (PRINT/SIGN/DATE)	12. QA/QC (PRINT/SIGN/DATE)	13. APPRVD./ACCPTD (PRINT/SIGN)	14. DATE (M/D/YY)
1	Final Issue	47	Eli Zane 4/1	Dan Peluso	Dan Peluso	Dan Peluso	4/30/15

CE&G
CAL ENGINEERING & GEOLOGY

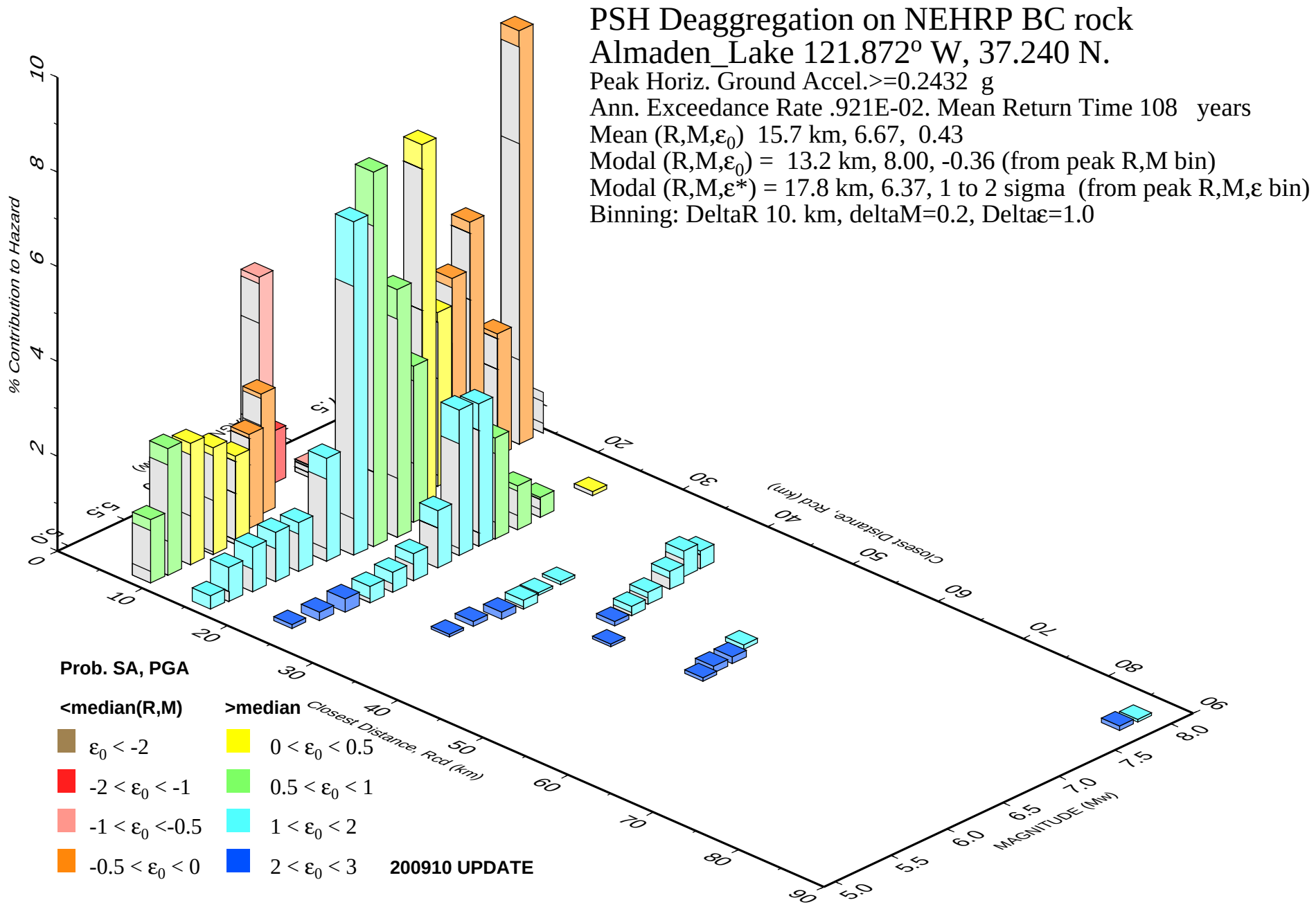
DOCUMENT REVIEW COVER SHEET

1. PROJECT NAME Almaden Lake Improvement Project	2. PROJECT NUMBER 140540
3. DOCUMENT TITLE Appendix E Slope Stability	
4. DOCUMENT STATUS DESIGNATION ☐ Preliminary ☒ Final ☐ Cancelled	
5. NOTES/COMMENTS The purpose of this calculation is to perform slope stability analysis in conformance with USACE guidelines (USACE, 2000) for static conditions, end-of-construction condition, steady state seepage condition, rapid drawdown condition, and earthquake loading condition.	

ATTACHMENTS	TOTAL NO. OF PAGES
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Alternative 7 Station 12+00 Cross Section Stability Analysis Results	14

RECORD OF REVISIONS

6. NO.	7. REASON FOR REVISION	8. TOT. PGS	10. ORIGINATOR (PRINT/SIGN/DATE)	11. CHECKER (PRINT/SIGN/DATE)	12. QA/QC (PRINT/SIGN/DATE)	13. APPRVD./ACCPTD (PRINT/SIGN)	14. DATE (M/D/YY)
1	Final Issue	13	Eli Zane	Dan Peluso	Dan Peluso	Dan Peluso	4/30/15


PSH Deaggregation on NEHRP BC rock
Almaden_Lake 121.872º W, 37.240 N.
Peak Horiz. Ground Accel.>=0.2432 g
Ann. Exceedance Rate .921E-02. Mean Return Time 108 years
Mean (R,M,ε0) 15.7 km, 6.67, 0.43
Modal (R,M,ε0) = 13.2 km, 8.00, -0.36 (from peak R,M bin)
Modal (R,M,ε*) = 17.8 km, 6.37, 1 to 2 sigma (from peak R,M,ε bin)
Binning: DeltaR 10. km, deltaM=0.2, Deltaε=1.0
% Contribution to Hazard
Closest Distance, Rcd (km)
MAGNITUDE (Mw)
Prob. SA, PGA
<median(R,M)
>median
ε0 < -2
-2 < ε0 < -1
-1 < ε0 <-0.5
-0.5 < ε0 < 0
0 < ε0 < 0.5
0.5 < ε0 < 1
1 < ε0 < 2
2 < ε0 < 3
200910 UPDATE

where *NRF* is a factor that accounts for the nonlinear response of the materials above the slide plane; u is displacement; and D_{5-95} is the duration of strong shaking, a function of earthquake magnitude and distance.

Blake and others (2002) have simplified the process of estimating f_{eq} for ranges of magnitude and distance by preparing sets of curves for two displacement (u) values, 5 cm and 15 cm. These curves are reproduced in Figure 1.

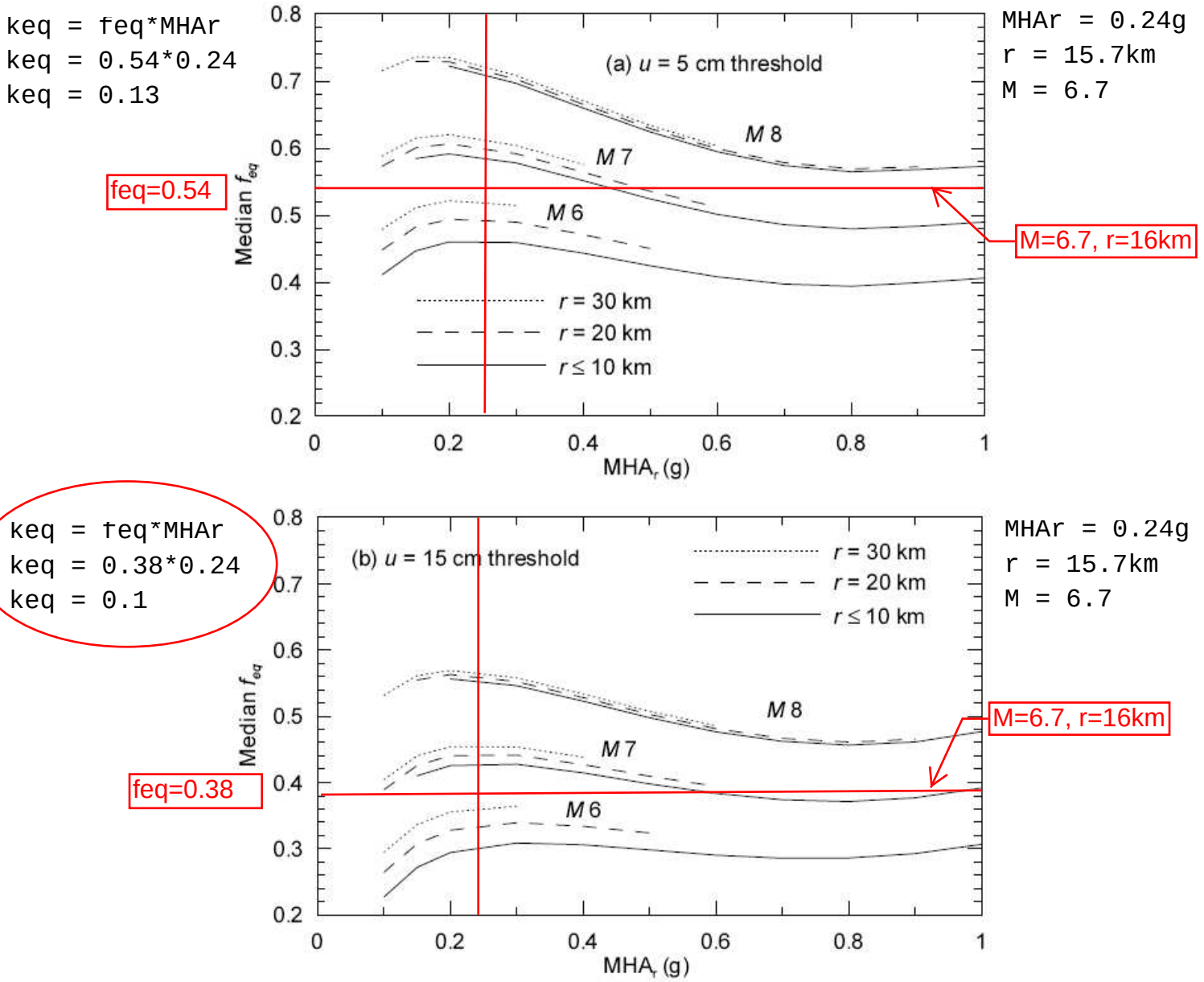


Figure 1. Values of f_{eq} as a Function of MHA_r, Magnitude and Distance for Threshold Displacements of (a) 5 cm and (b) 15 cm (Modified from Blake and others, 2002).

Almaden Lake Improvements Project
Alternative 6 Station 2+50
Static Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

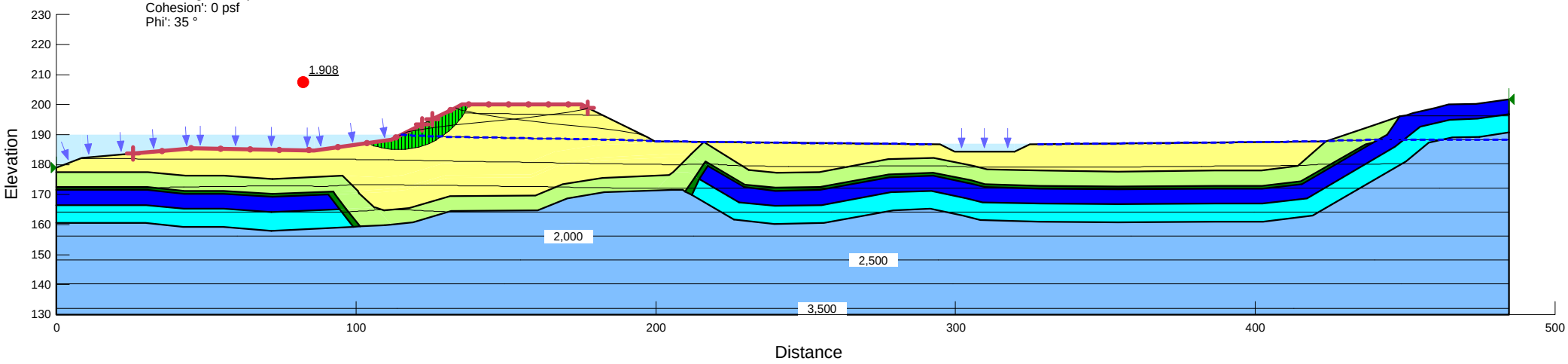
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Steady Seepage Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

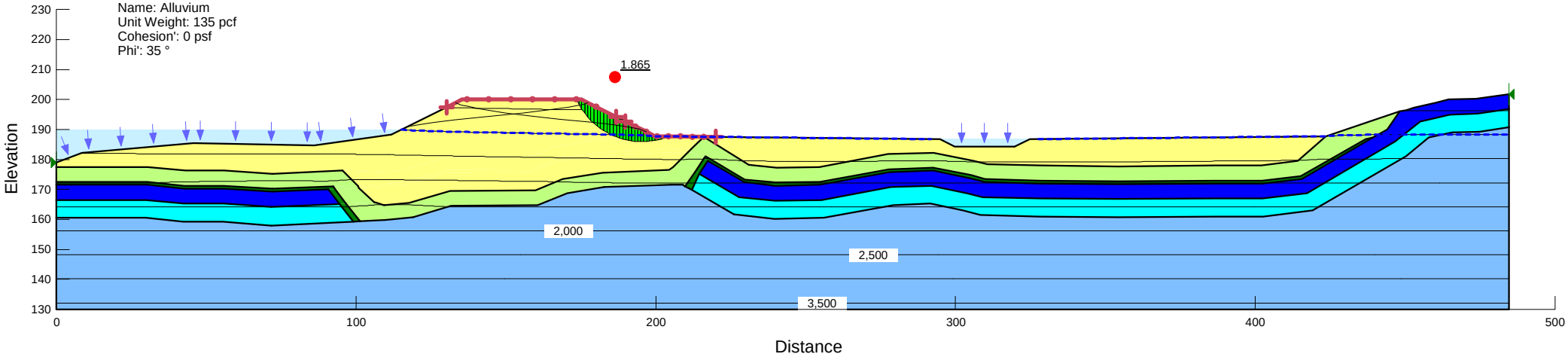
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 2+50
End of Construction Lakeside

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

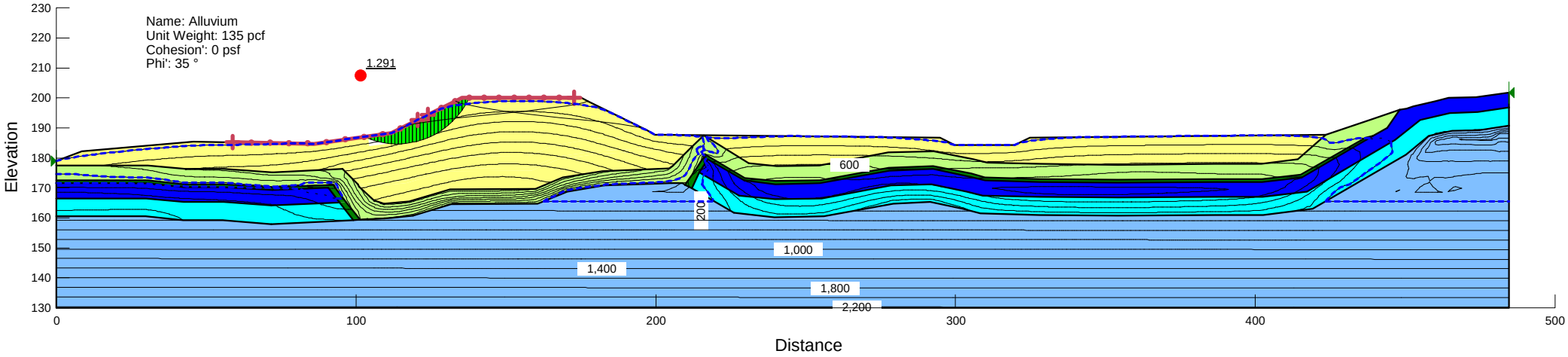
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 2+50
End of Construction Creekside

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

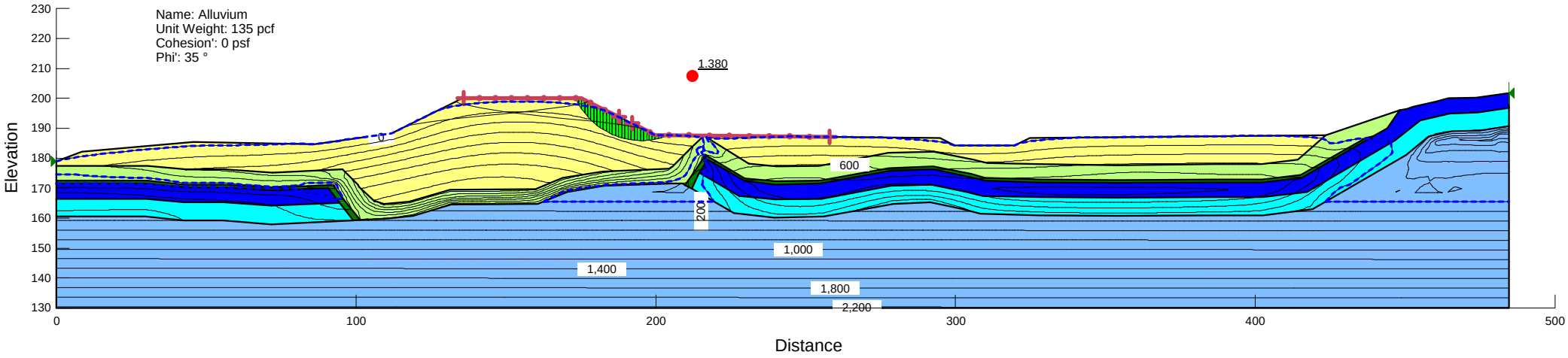
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Steady Seepage Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

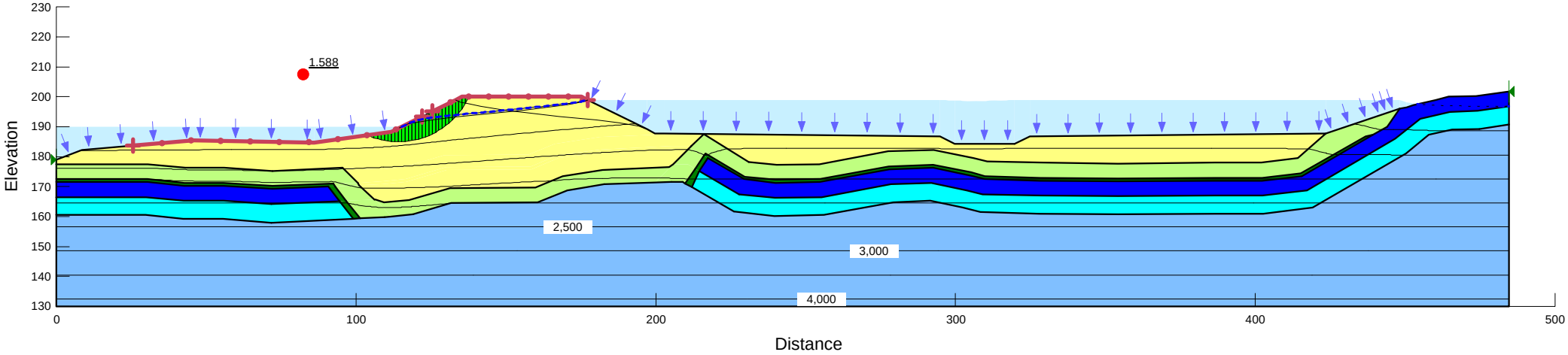
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Steady Seepage Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

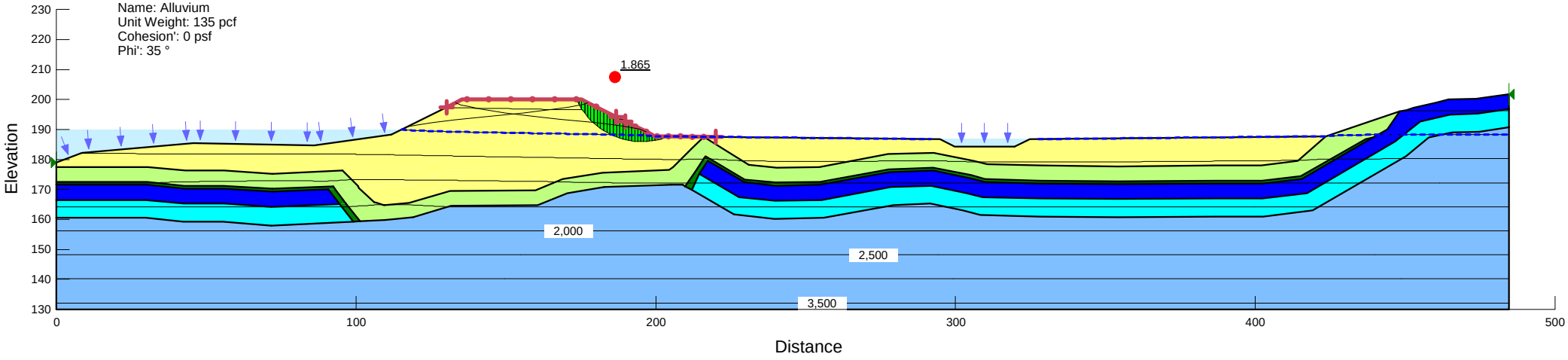
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Rapid Drawdown Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Total Cohesion: 2,000 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 2

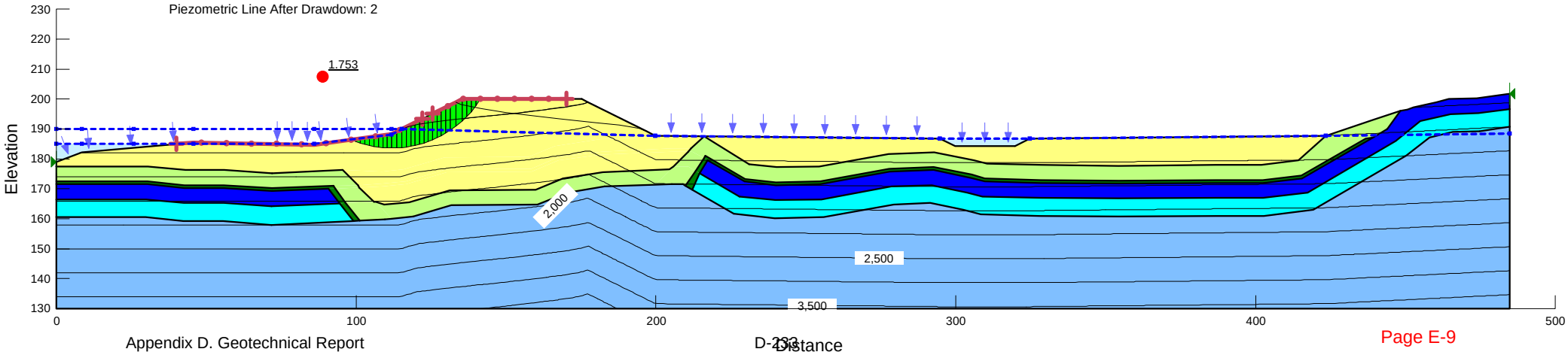
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Total Cohesion: 1,500 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 2

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Total Cohesion: 1 psf
Total Phi: 32 °
Piezometric Line After Drawdown: 2

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °
Total Cohesion: 301 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 2

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °
Total Cohesion: 201 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 2

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Total Cohesion: 1 psf
Total Phi: 34 °
Piezometric Line After Drawdown: 2



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Rapid Drawdown Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

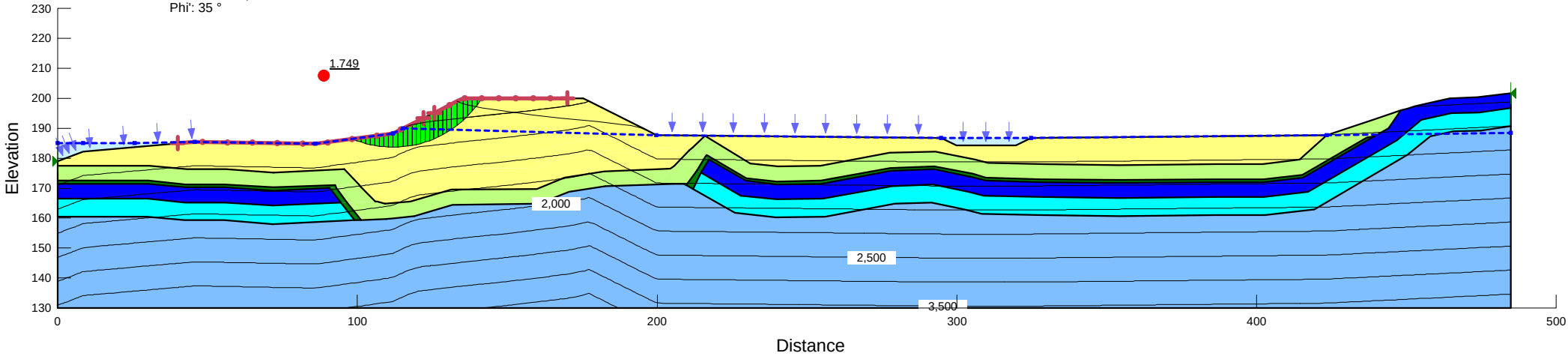
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Rapid Drawdown Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Total Cohesion: 2,000 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 1

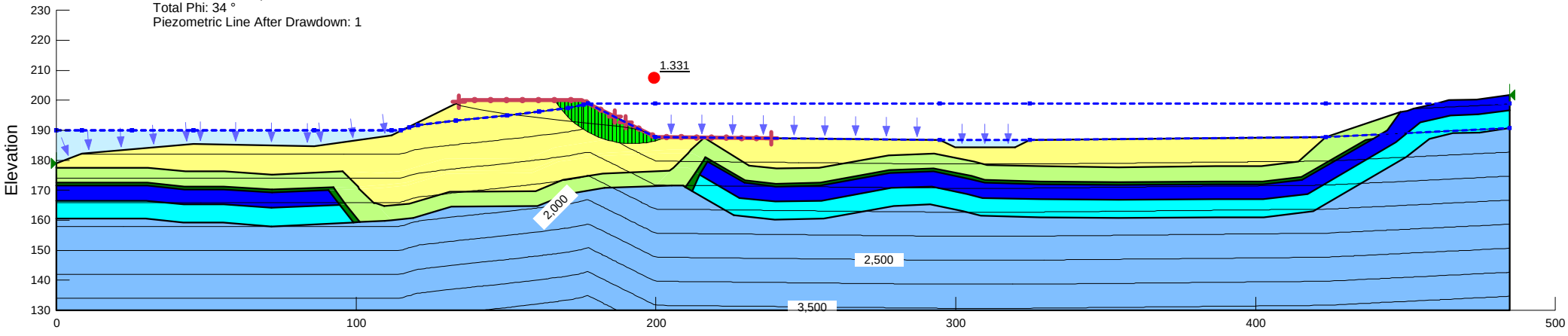
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Total Cohesion: 1,500 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 1

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Total Cohesion: 1 psf
Total Phi: 32 °
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °
Total Cohesion: 301 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °
Total Cohesion: 201 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Total Cohesion: 1 psf
Total Phi: 34 °
Piezometric Line After Drawdown: 1



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Rapid Drawdown Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

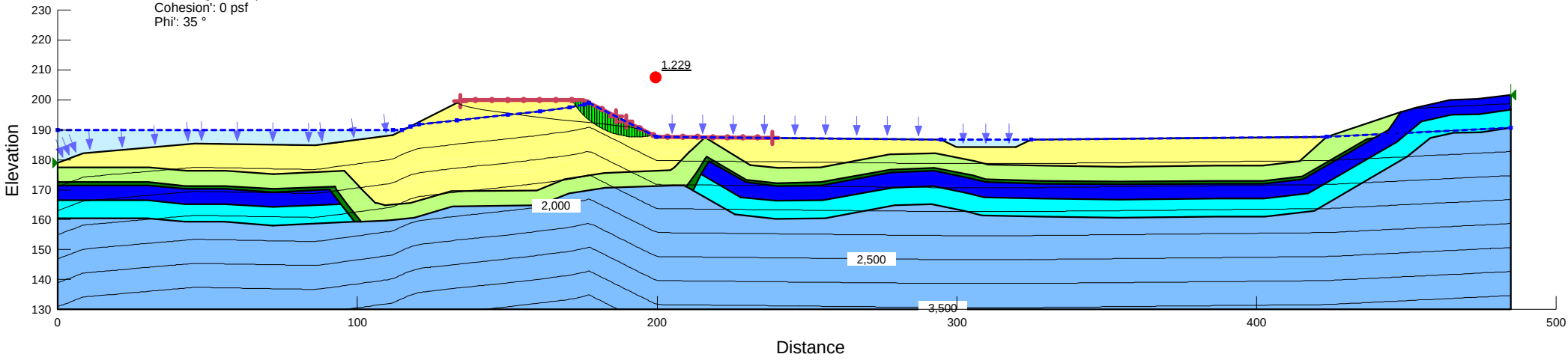
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Seismic Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2,000 psf

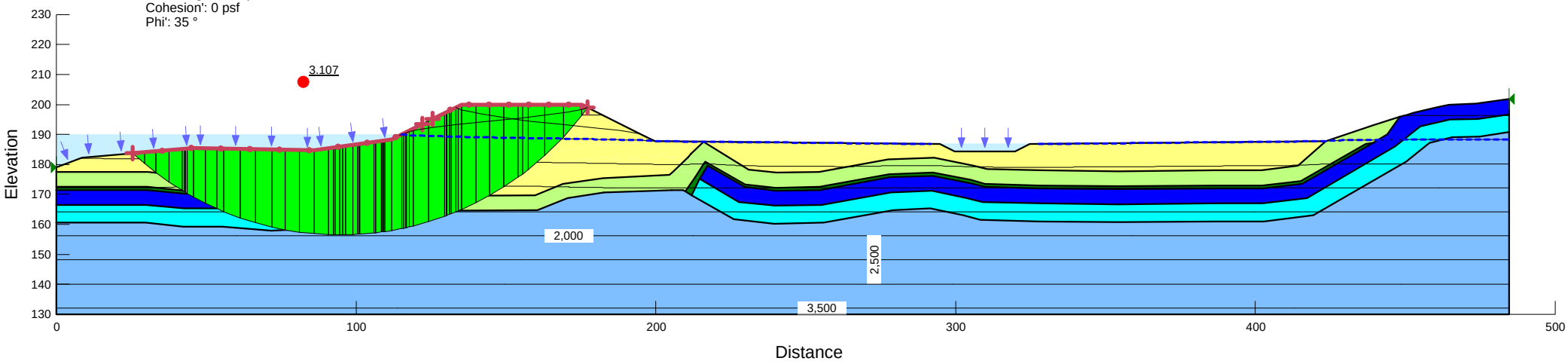
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2,000 psf

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Seismic Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

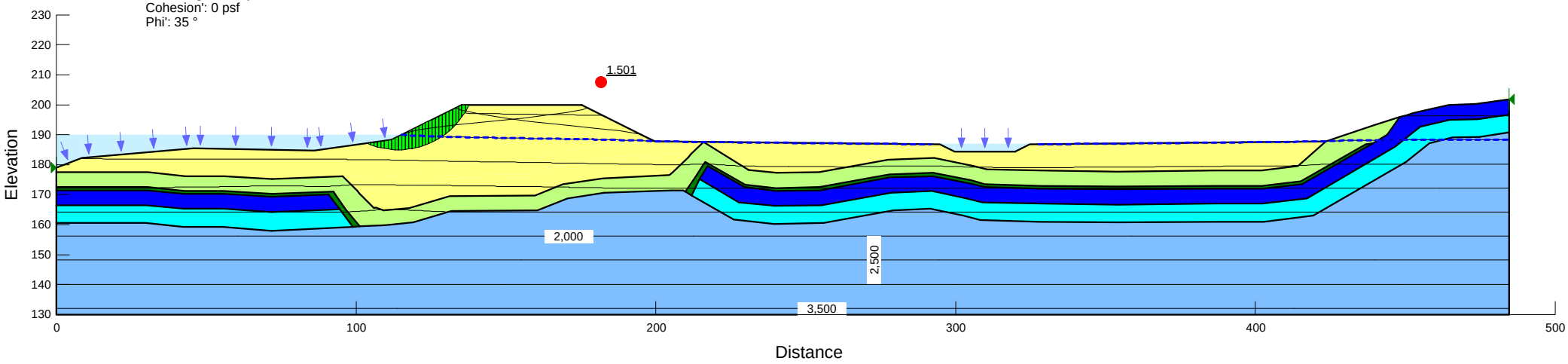
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Seismic Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2,000 psf

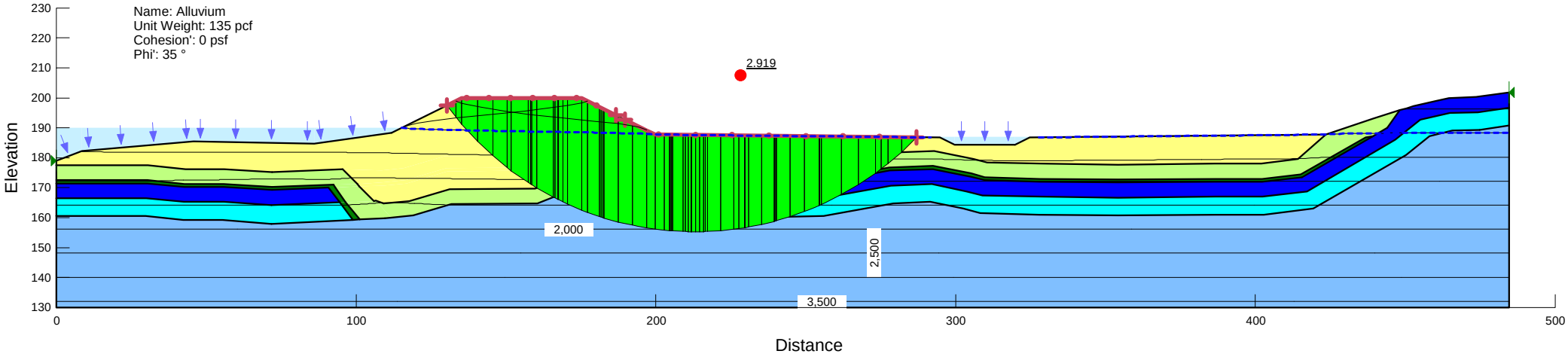
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2,000 psf

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Seismic Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

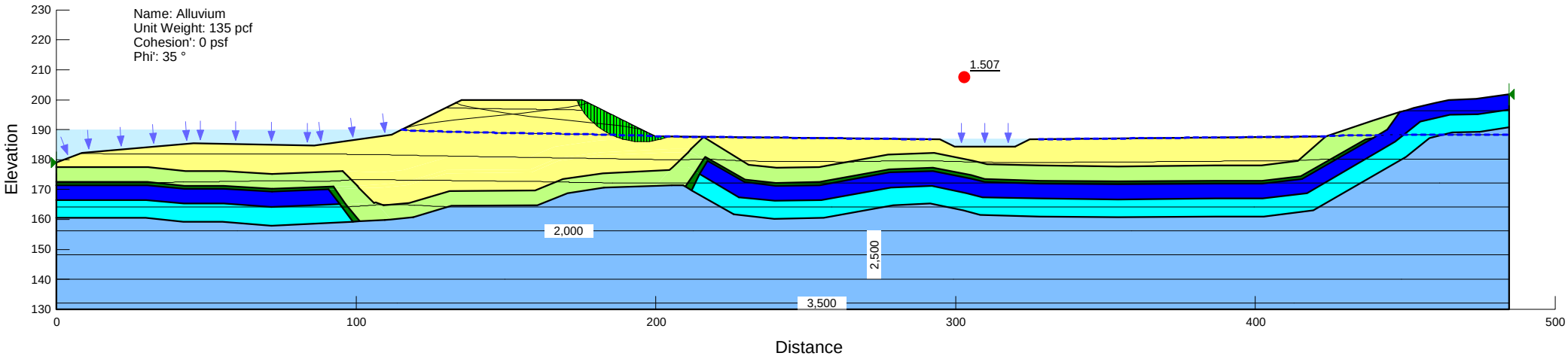
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 7+00
Static

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28

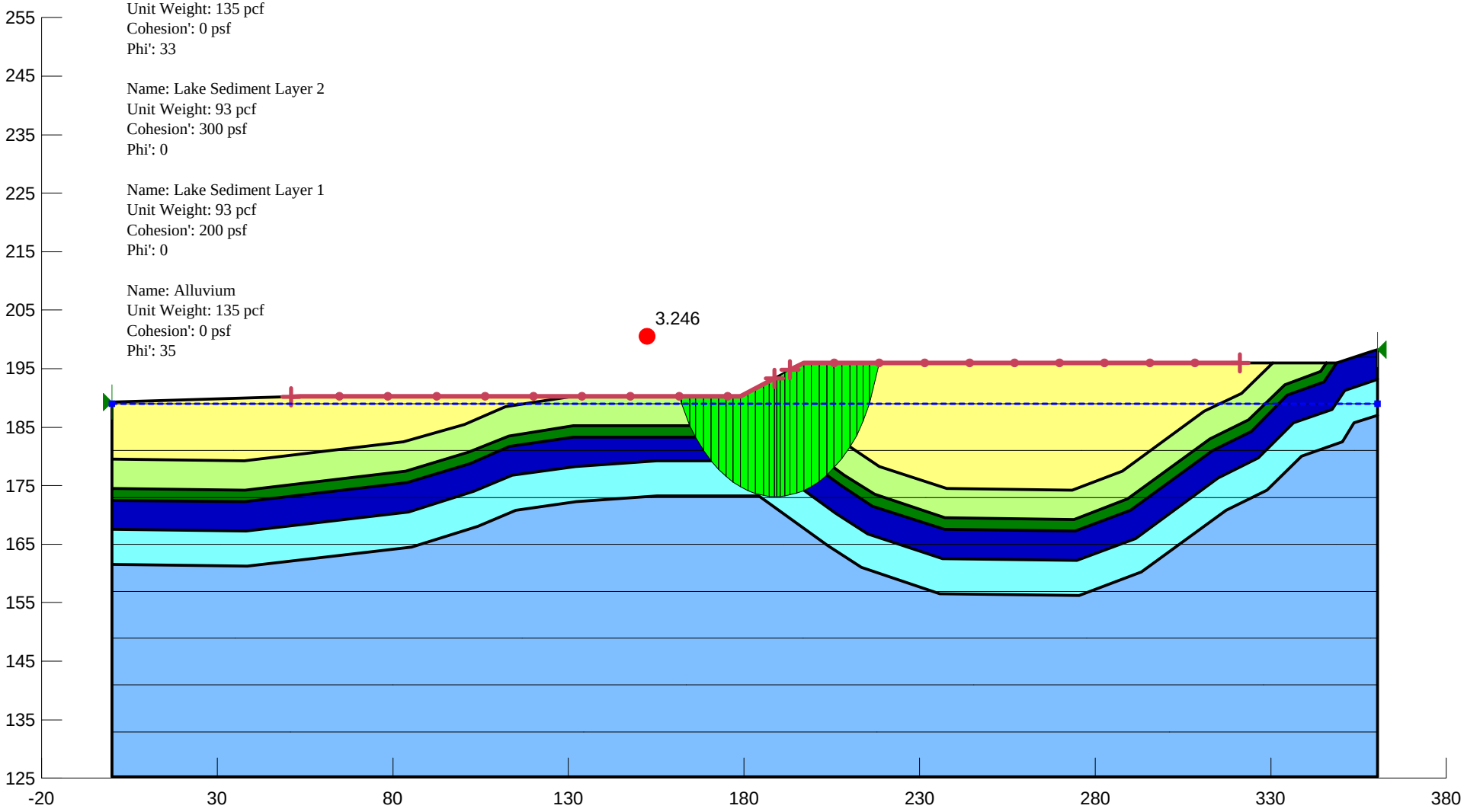
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35



Almaden Lake Improvements Project
Alternative 6 Station 7+00
Rapid Drawdown

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Total Stress Cohesion: 2000 psf
Phi': 28
Total Stress Phi: 0

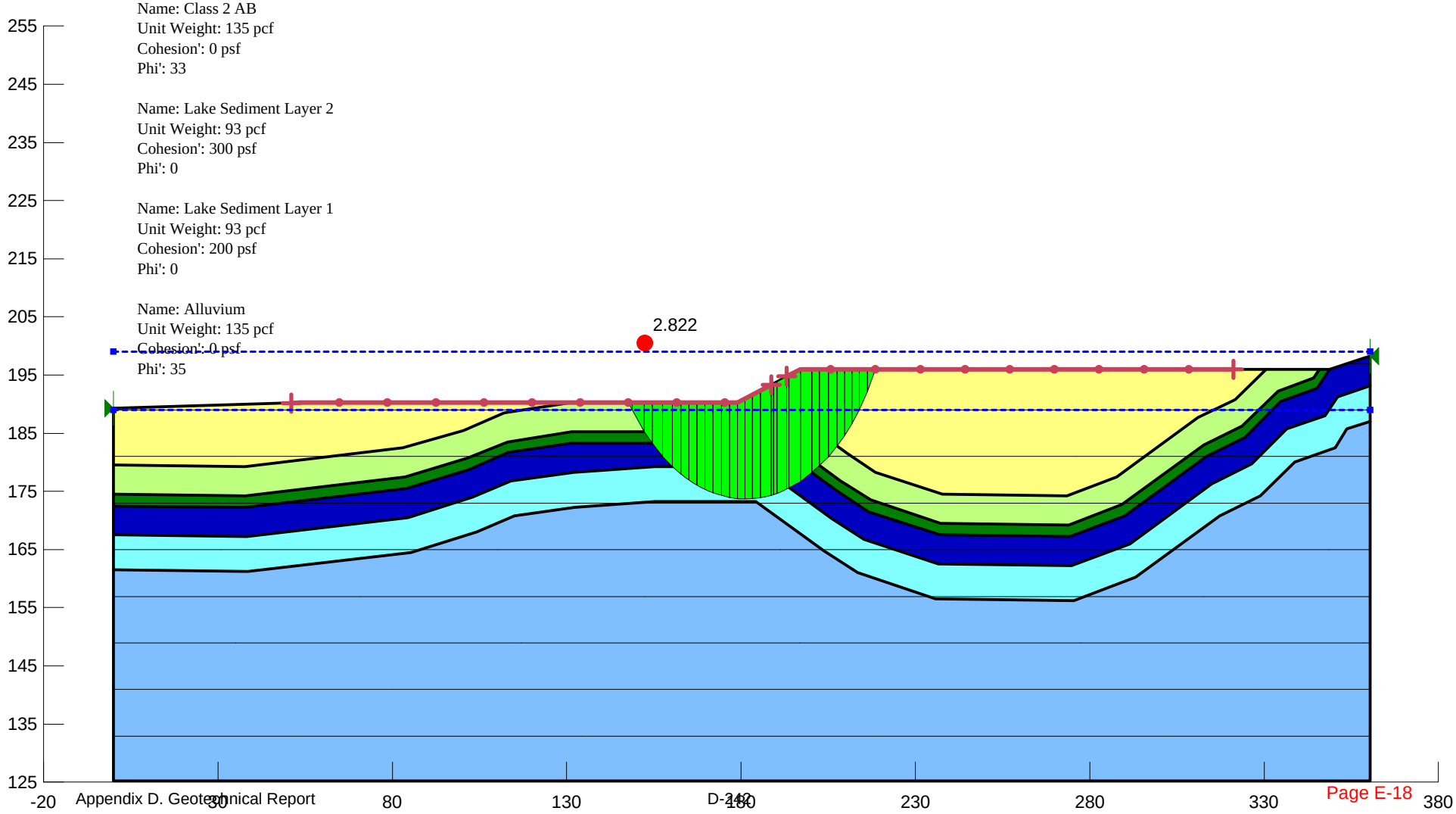
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Total Stress Cohesion: 2000 psf
Phi': 20
Total Stress Phi: 0

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35



Almaden Lake Improvements Project
Alternative 6 Station 7+00
Seismic

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2000 psf
Phi': 0

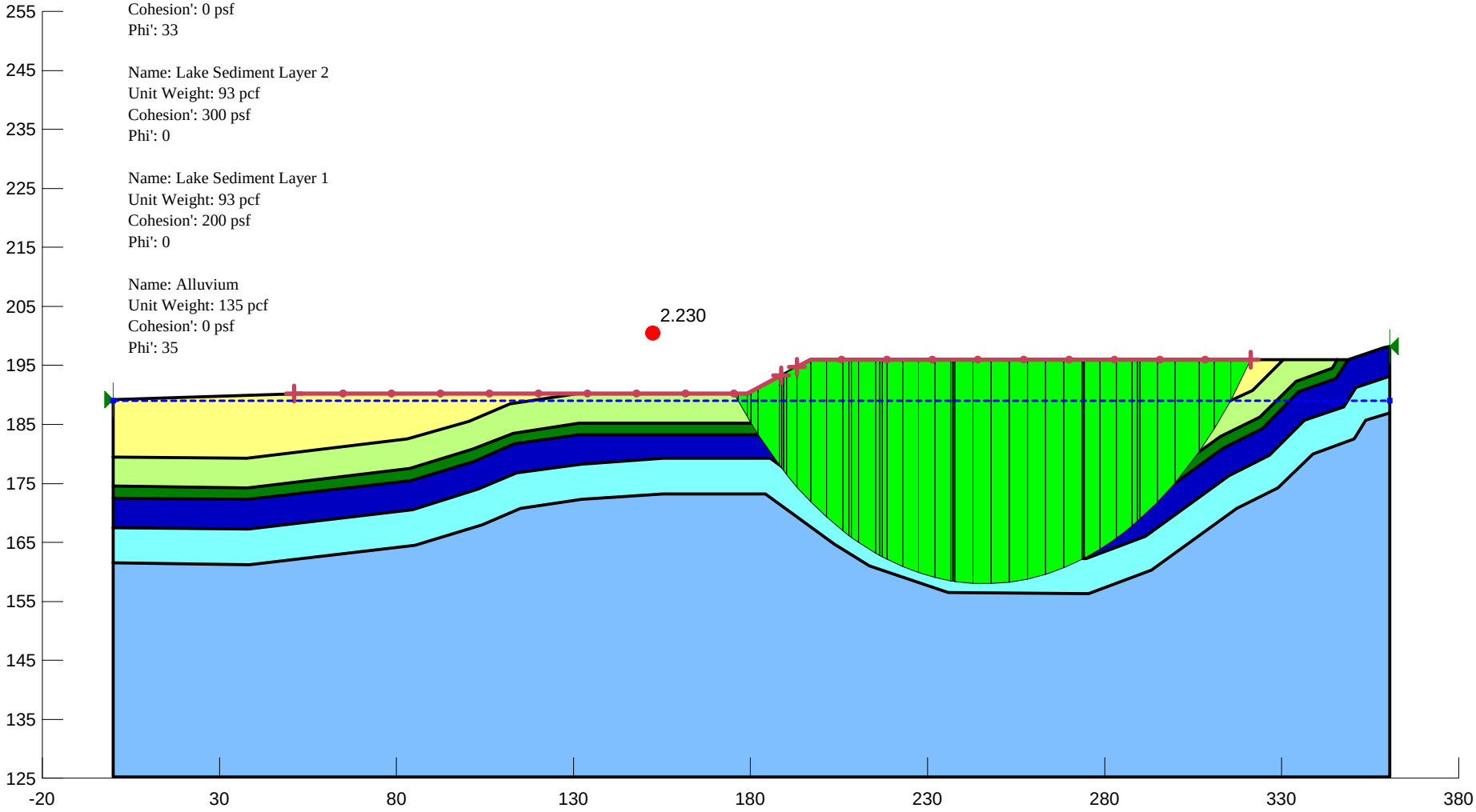
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2000 psf
Phi': 0

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Static Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

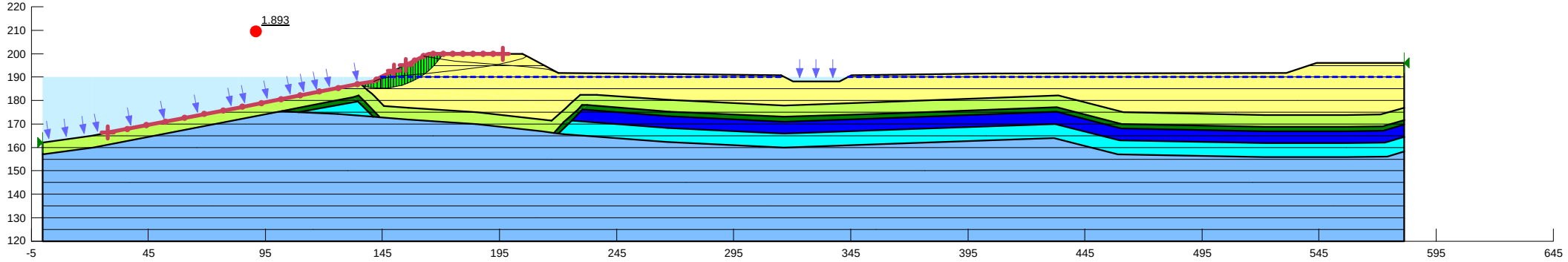
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Static Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

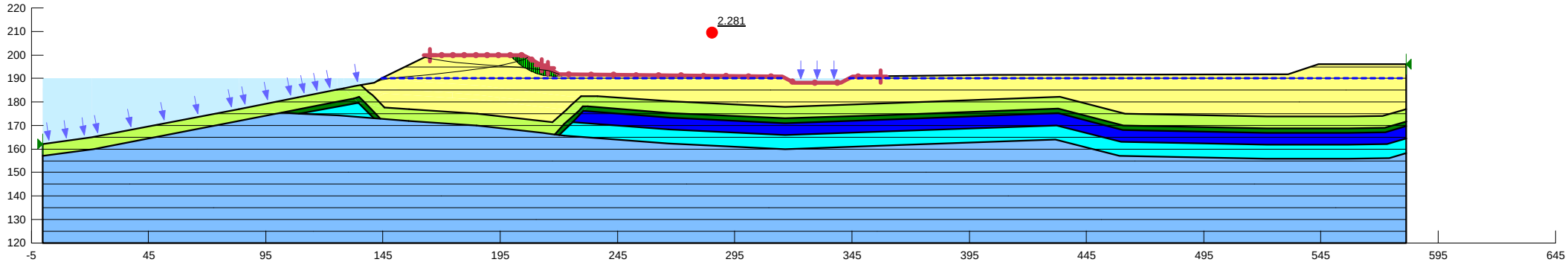
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 10+00
End of Construction Lakeside

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

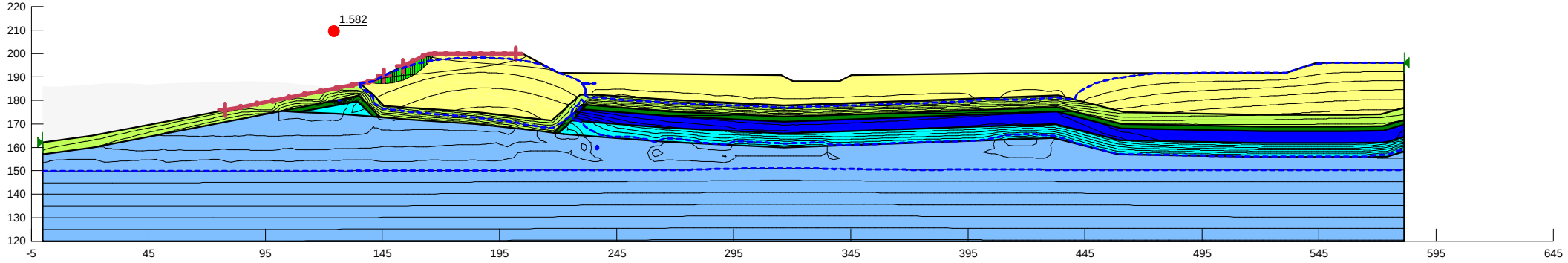
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 10+00
End of Construction Creekside

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

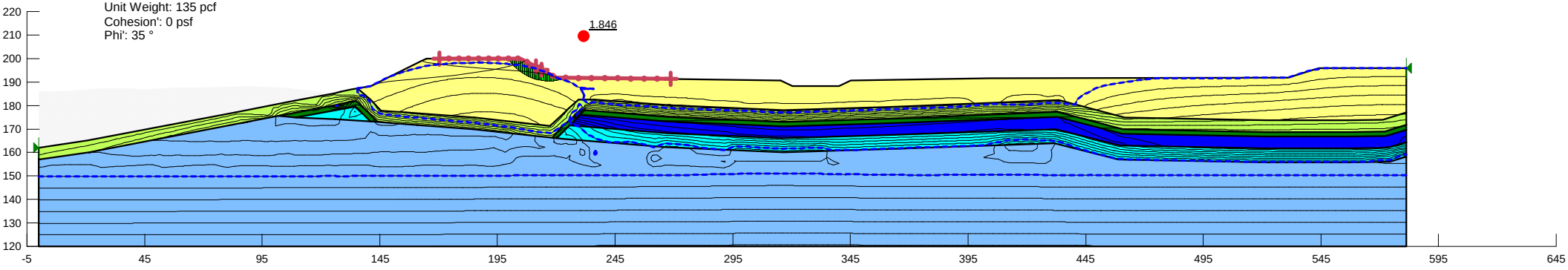
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Steady Seepage Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

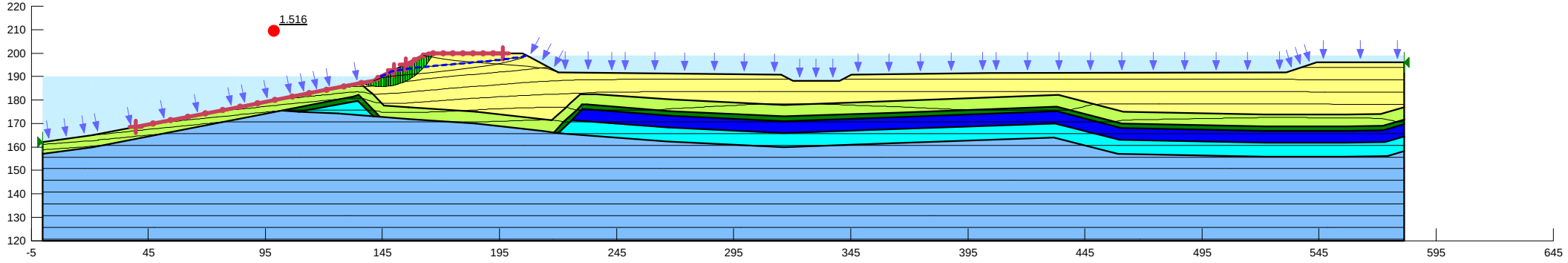
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Static Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

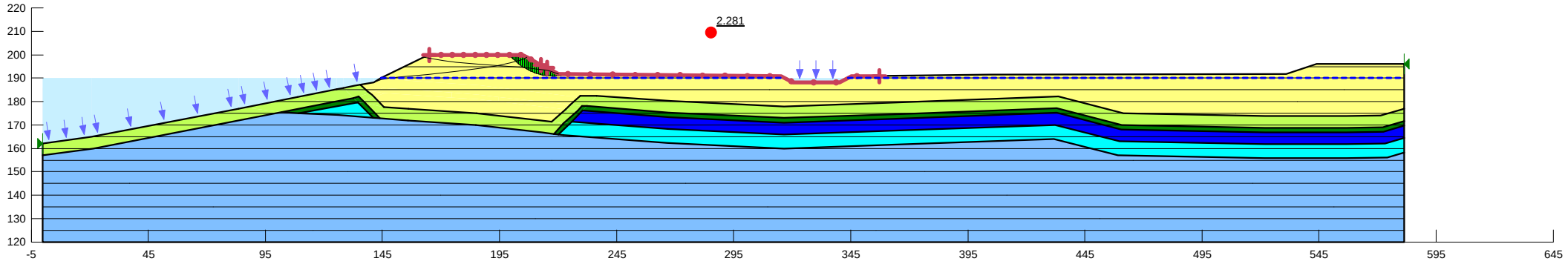
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Rapid Drawdown

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Total Cohesion: 2,000 psf
Total Phi: 0 °

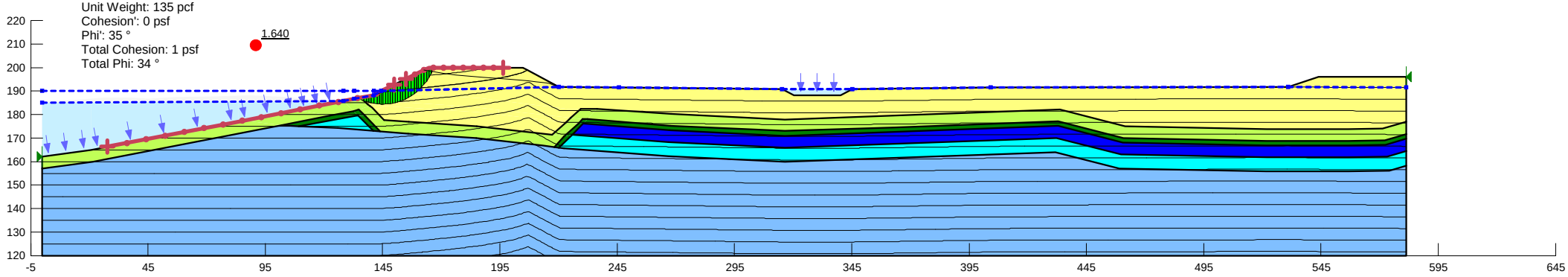
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °
Total Cohesion: 301 psf
Total Phi: 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °
Total Cohesion: 201 psf
Total Phi: 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Total Cohesion: 2,000 psf
Total Phi: 0 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Total Cohesion: 1 psf
Total Phi: 32 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Total Cohesion: 1 psf
Total Phi: 34 °



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Rapid Drawdown Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Piezometric Line: 1

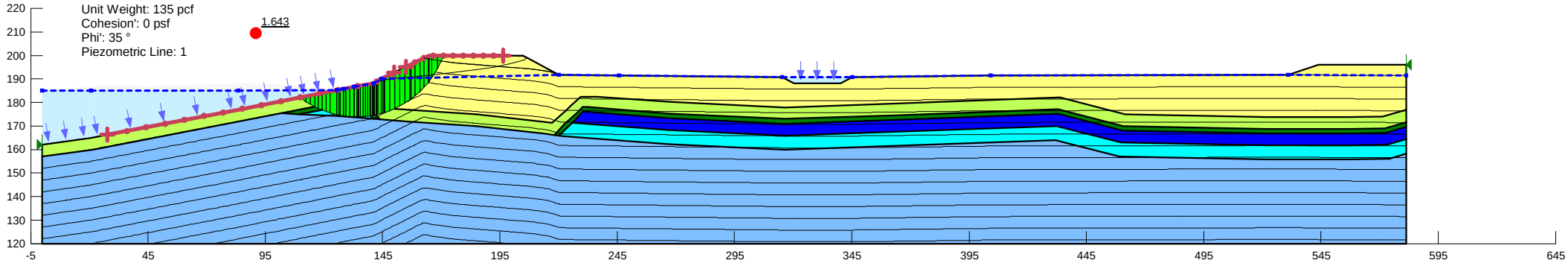
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °
Piezometric Line: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °
Piezometric Line: 1

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Piezometric Line: 1

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Piezometric Line: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Piezometric Line: 1



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Rapid Drawdown Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Total Cohesion: 2,000 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

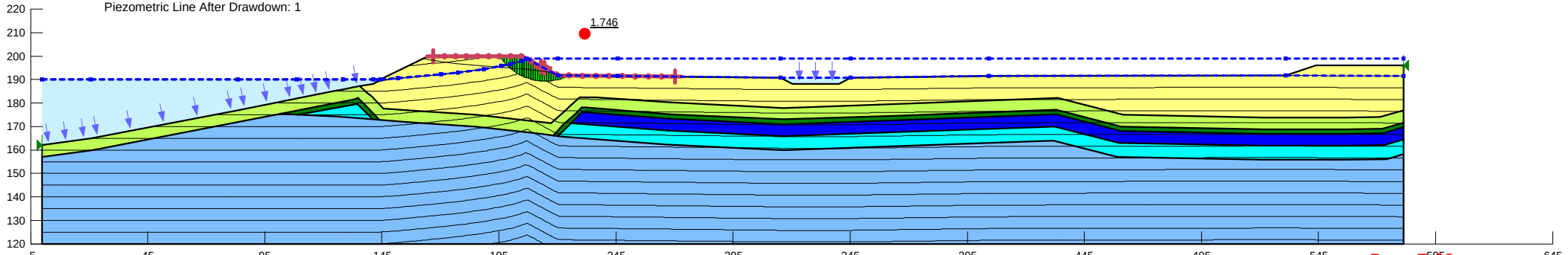
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °
Total Cohesion: 301 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °
Total Cohesion: 201 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Total Cohesion: 2,000 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Total Cohesion: 1 psf
Total Phi: 32 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Total Cohesion: 1 psf
Total Phi: 34 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Rapid Drawdown Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Piezometric Line: 1

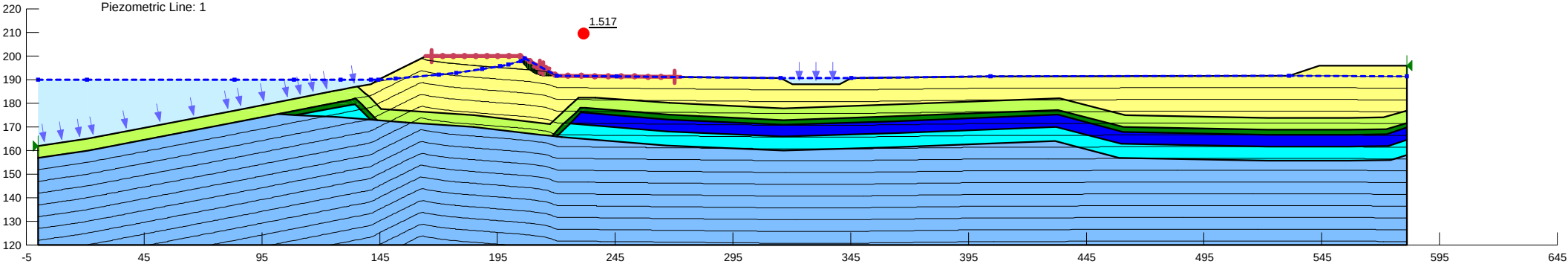
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °
Piezometric Line: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °
Piezometric Line: 1

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Piezometric Line: 1

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Piezometric Line: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Piezometric Line: 1



Alternative 7 Station 10+00
Seismic Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2,000 psf

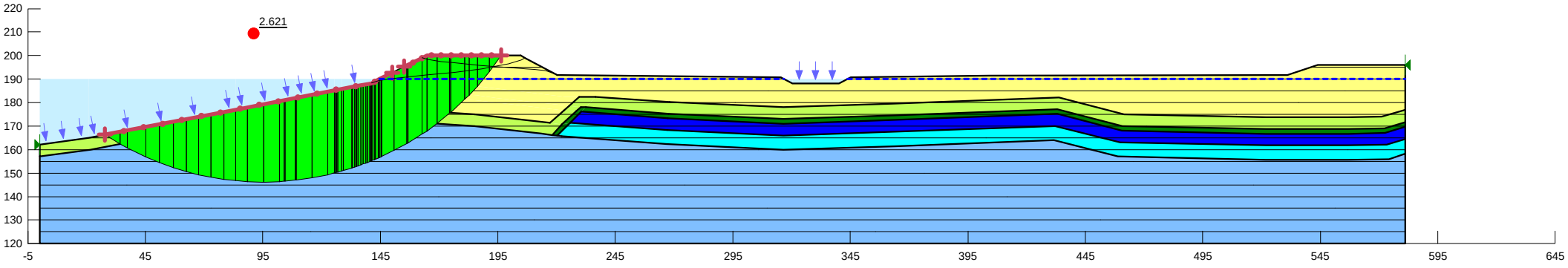
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2,000 psf

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Alternative 7 Station 10+00
Seismic Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

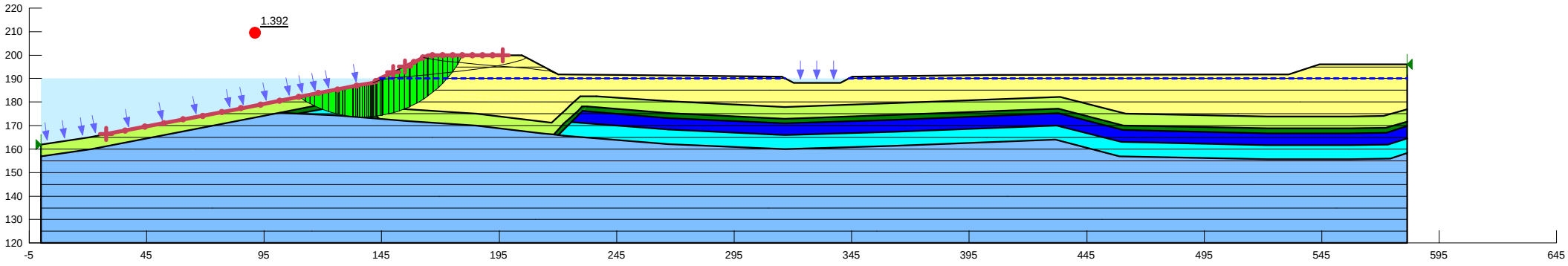
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Alternative 7 Station 10+00
Seismic Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2,000 psf

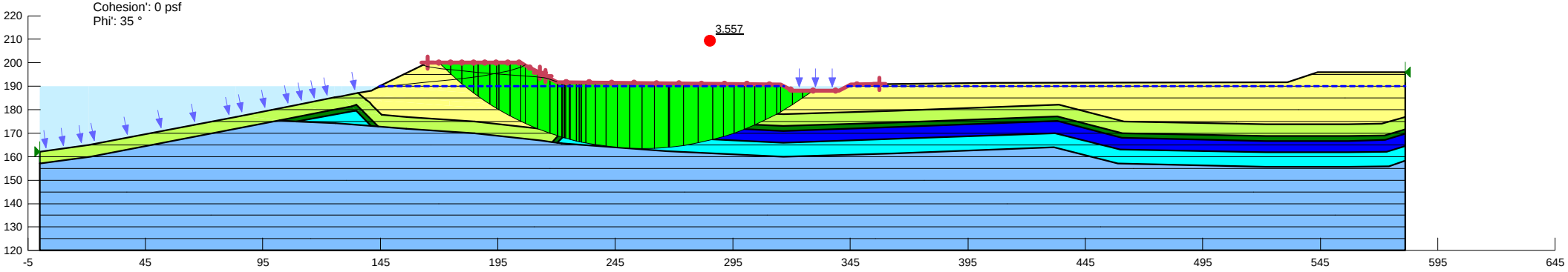
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2,000 psf

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Alternative 7 Station 10+00
Seismic Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

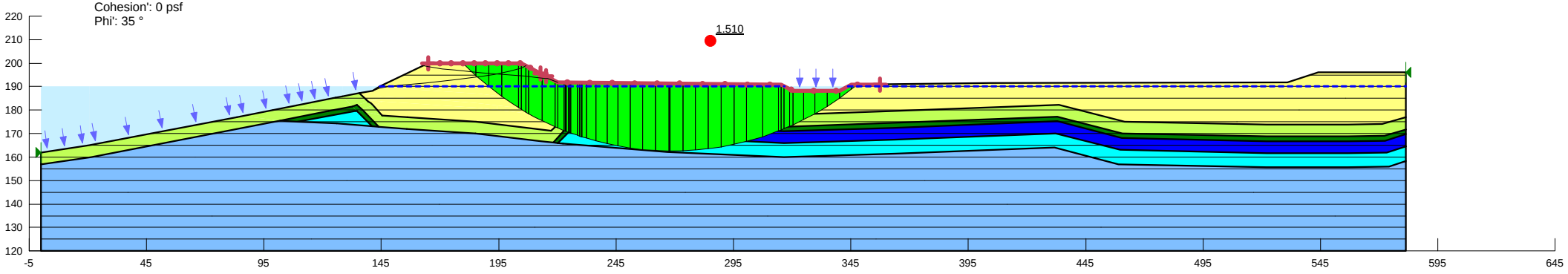
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Static Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

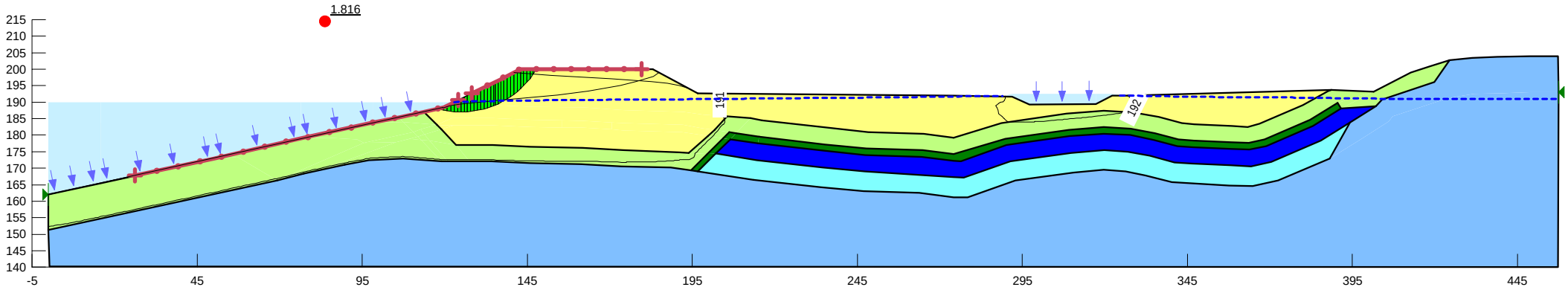
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Static Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

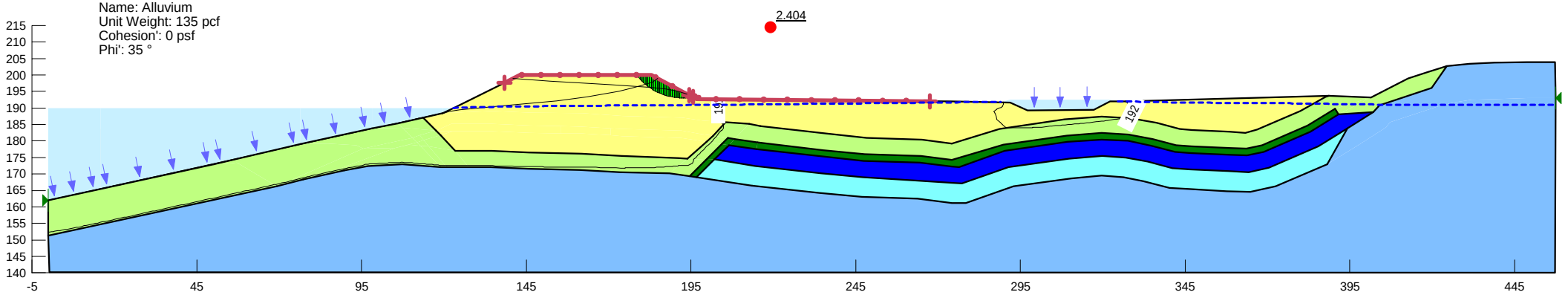
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
End of Construction Lakeside

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

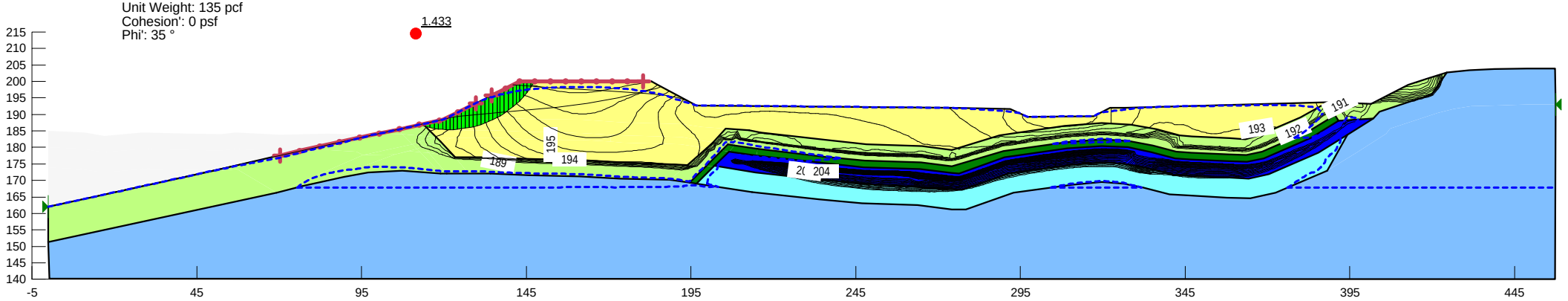
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
End of Construction Creekside

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

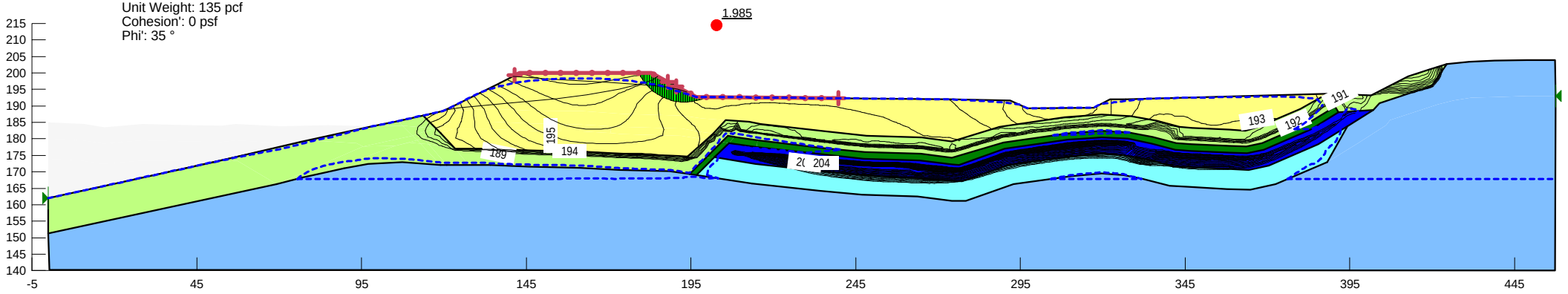
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Steady Seepage Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

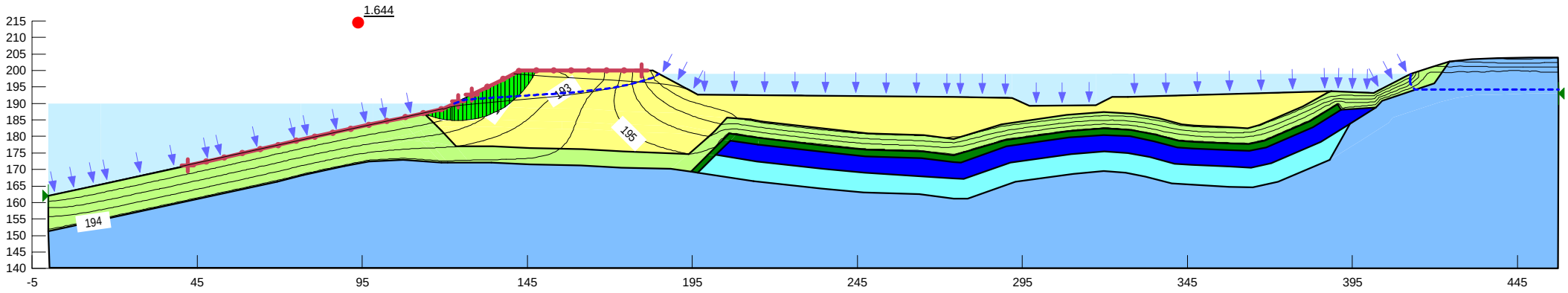
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Static Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

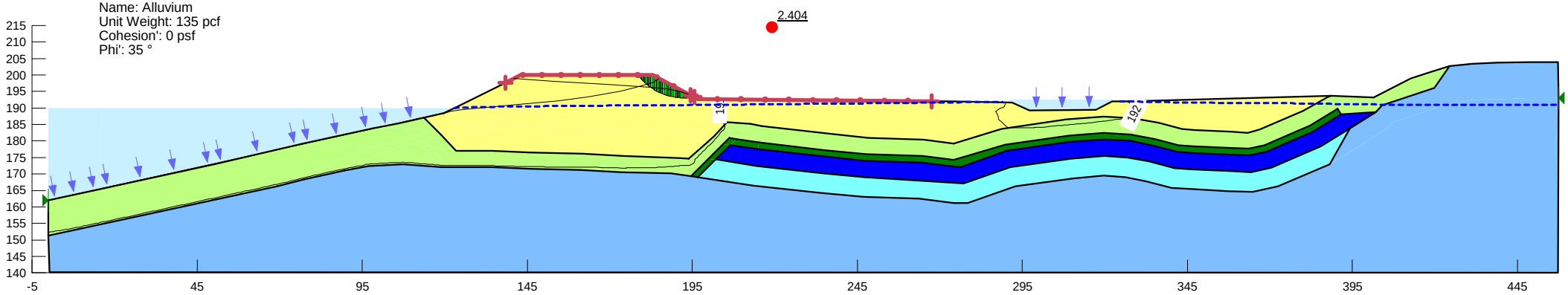
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Rapid Drawdown Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Total Cohesion: 200 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

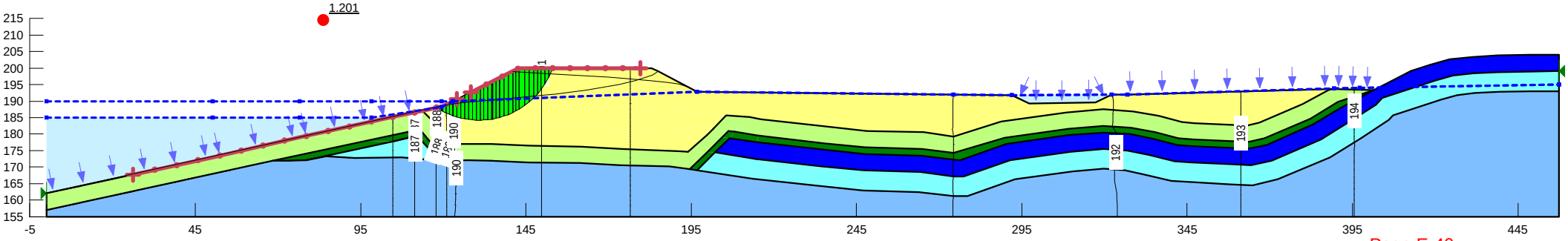
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Total Cohesion: 2,000 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Total Cohesion: 1 psf
Total Phi: 32 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °
Total Cohesion: 201 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °
Total Cohesion: 301 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Total Cohesion: 1 psf
Total Phi: 34 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Rapid Drawdown Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Piezometric Line: 1

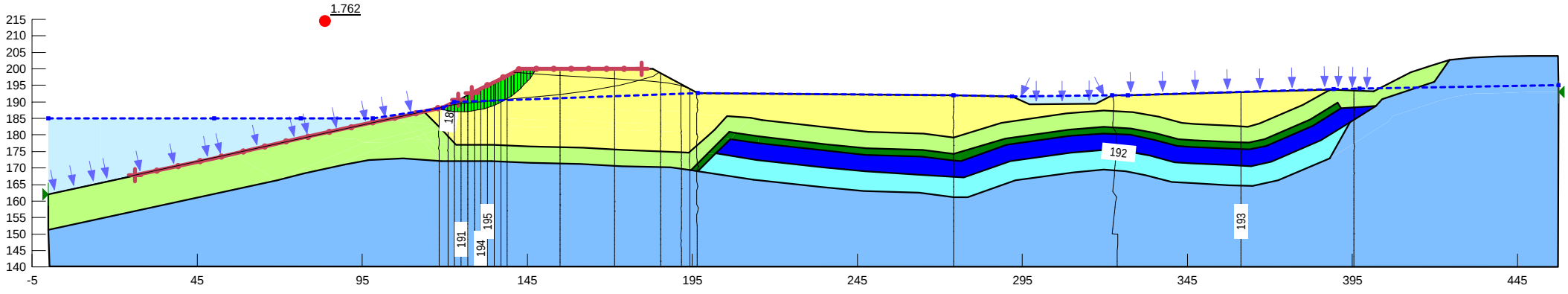
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Piezometric Line: 1

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Piezometric Line: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °
Piezometric Line: 1

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °
Piezometric Line: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Piezometric Line: 1



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Rapid Drawdown Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Total Cohesion: 200 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

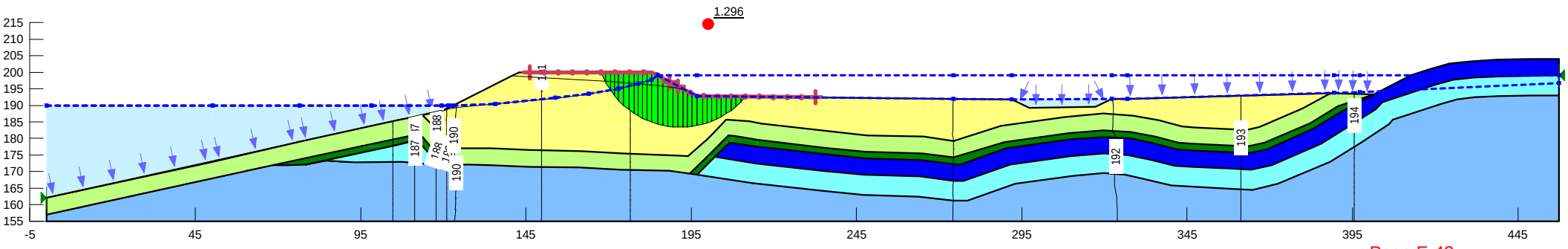
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Total Cohesion: 2,000 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Total Cohesion: 1 psf
Total Phi: 32 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °
Total Cohesion: 201 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °
Total Cohesion: 301 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Total Cohesion: 1 psf
Total Phi: 34 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Rapid Drawdown Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Piezometric Line: 1

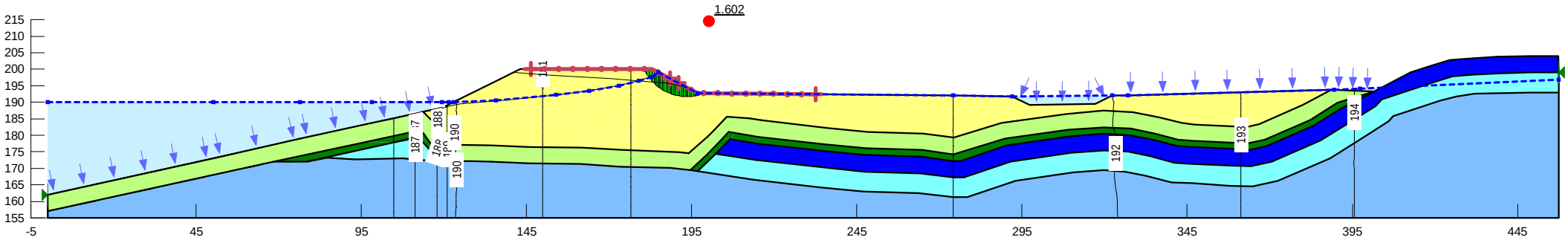
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Piezometric Line: 1

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Piezometric Line: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °
Piezometric Line: 1

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °
Piezometric Line: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Piezometric Line: 1



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Seismic Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2,000 psf

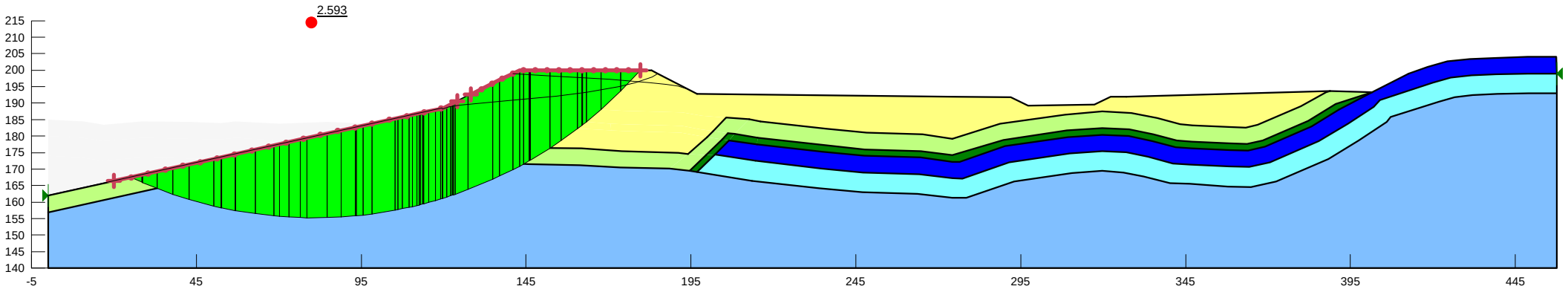
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2,000 psf

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Seismic Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

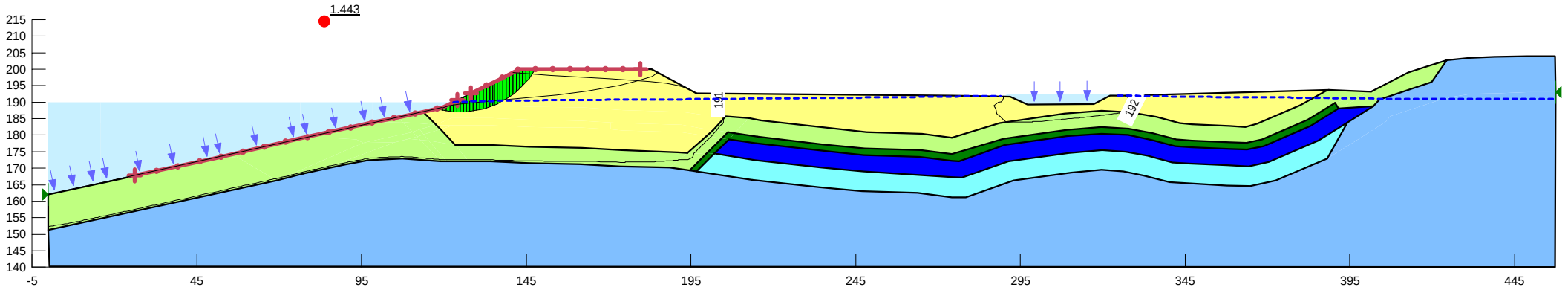
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Seismic Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2,000 psf

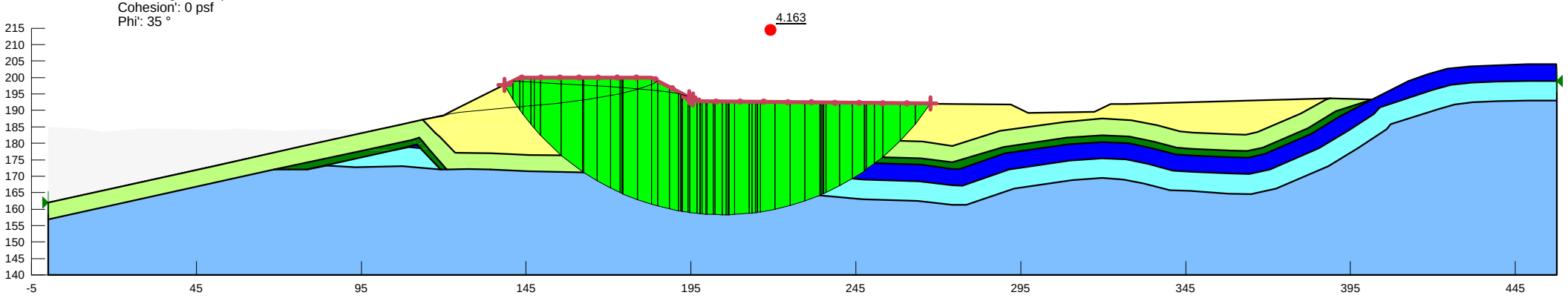
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2,000 psf

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Seismic Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

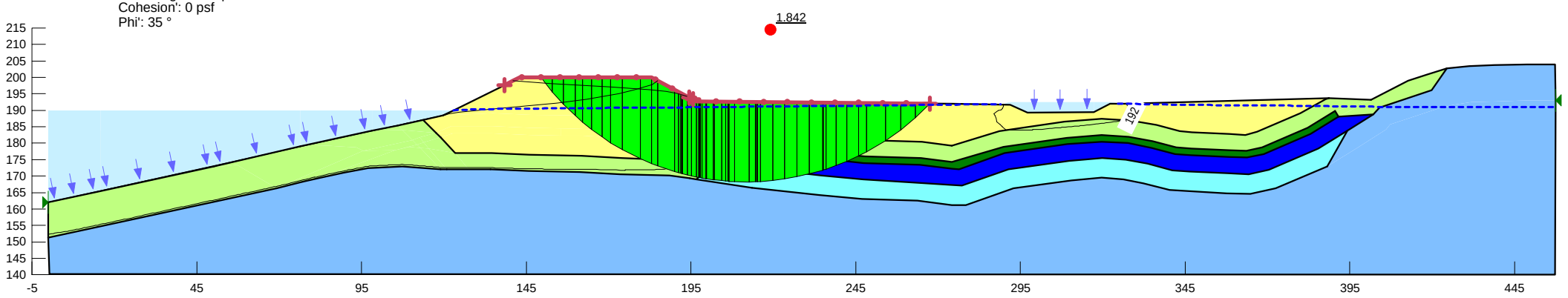
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



APPENDIX F

Settlement Calculations

CE&G
CAL ENGINEERING & GEOLOGY

DOCUMENT REVIEW COVER SHEET

1. PROJECT NAME	2. PROJECT NUMBER
Almaden Lake Improvement Project	140540

3. DOCUMENT TITLE
Appendix F Settlement Analysis

4. DOCUMENT STATUS DESIGNATION
☐ Preliminary ☒ Final ☐ Cancelled

5. NOTES/COMMENTS
The purpose of this calculation is to perform a settlement analysis in conformance with USACE guidelines (USACE, 2000).

ATTACHMENTS	TOTAL NO. OF PAGES
Excel Calculation of Anticipated Settlement at the Crest of the Levee	1
SIGMA/W Calculation of Settlement Profile along each Cross Section	3
Hand Calculation For Time To Reach 95% Consolidation	1
Wb-1 Cc, Cr, And Cv Determination	13
Wb-1 Cc, Cr, And Cv Determination	11

RECORD OF REVISIONS

6. NO.	7. REASON FOR REVISION	8. TOT. PGS	10. ORIGINATOR (PRINT/SIGN/DATE)	11. CHECKER (PRINT/SIGN/DATE)	12. QA/QC (PRINT/SIGN/DATE)	13. APPRVD./ACCPTD (PRINT/SIGN)	14. DATE (M/D/YY)
1	Final Issue	29	Eli Zane	Dan Peluso	Dan Peluso	Dan Peluso	4/30/15

Sublayer Properties							Sublayer Depth			Sublayer Thickness	Effective Stress	Preconsolidation Pressure	Pressure Change	X times initial effective	Final Pressure	Void Ratio	Compression Ratio		Recompression Vertical Strain	Virgin Vertical Strain	Total Vertical Strain	Change in Thickness (in)
Layer #	Soil Type (USCS)	γ_d (lb/ft^3)	ω (%)	γ (lb/ft^3)	γ_w (lb/ft^3)	γ' (lb/ft^3)	Top (ft)	Bottom (ft)	Average (ft)	H_o (ft)	σ'_{vo} (lb/ft^2)	σ'_p (lb/ft^2)	Δ_P (lb.ft^2)		P_f (lb/ft^2)	e_0	Recompression C_{cr}	Virgin C_{cC}	$\varepsilon_r{}^*{}_z$	$\varepsilon_v{}^*{}_z$	$\varepsilon_t{}^*{}_z$	ε_z H_0 = ΔH
1	Lake Sed	49	74	93	62.4	31	0.0	1.0	0.5	1.0	15	430	2,738	179.0	2,753	2.09	0.060	0.180	0.0281	0.1452	0.1733	2.08
2	Lake Sed	49	74	93	62.4	31	1.0	2.0	1.5	1.0	46	430	2,738	59.7	2,784	2.09	0.060	0.180	0.0189	0.1460	0.1649	1.98
3	Lake Sed	49	74	93	62.4	31	2.0	3.0	2.5	1.0	77	430	2,738	35.8	2,815	2.09	0.060	0.180	0.0146	0.1469	0.1614	1.94
4	Lake Sed	49	74	93	62.4	31	3.0	4.0	3.5	1.0	107	430	2,738	25.6	2,845	2.09	0.060	0.180	0.0117	0.1477	0.1594	1.91
5	Lake Sed	49	74	93	62.4	31	4.0	5.0	4.5	1.0	138	430	2,738	19.9	2,876	2.09	0.060	0.180	0.0096	0.1486	0.1582	1.90
6	Lake Sed	49	74	93	62.4	31	5.0	6.0	5.5	1.0	168	430	2,738	16.3	2,906	2.09	0.060	0.180	0.0079	0.1494	0.1573	1.89
7	Lake Sed	49	74	93	62.4	31	6.0	7.0	6.5	1.0	199	630	2,738	13.8	2,937	2.09	0.020	0.220	0.0032	0.1471	0.1503	1.80
8	Lake Sed	49	74	93	62.4	31	7.0	8.0	7.5	1.0	230	630	2,738	11.9	2,968	2.09	0.020	0.220	0.0028	0.1481	0.1509	1.81
9	Lake Sed	49	74	93	62.4	31	8.0	9.0	8.5	1.0	260	630	2,738	10.5	2,998	2.09	0.020	0.220	0.0025	0.1491	0.1515	1.82
10	Lake Sed	49	74	93	62.4	31	9.0	10.0	9.5	1.0	291	630	2,738	9.4	3,029	2.09	0.020	0.220	0.0022	0.1500	0.1522	1.83
11	Lake Sed	49	74	93	62.4	31	10.0	11.0	10.5	1.0	321	630	2,738	8.5	3,059	2.09	0.020	0.220	0.0019	0.1510	0.1529	1.83
																					Total =	20.8

Almaden Lake Improvements Project
Alternative 6 Station 2+50
Settlement Profile

Name: Levee Fill
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 280,000 psf
Unit Weight: 127 pcf
Poisson's Ratio: 0.35

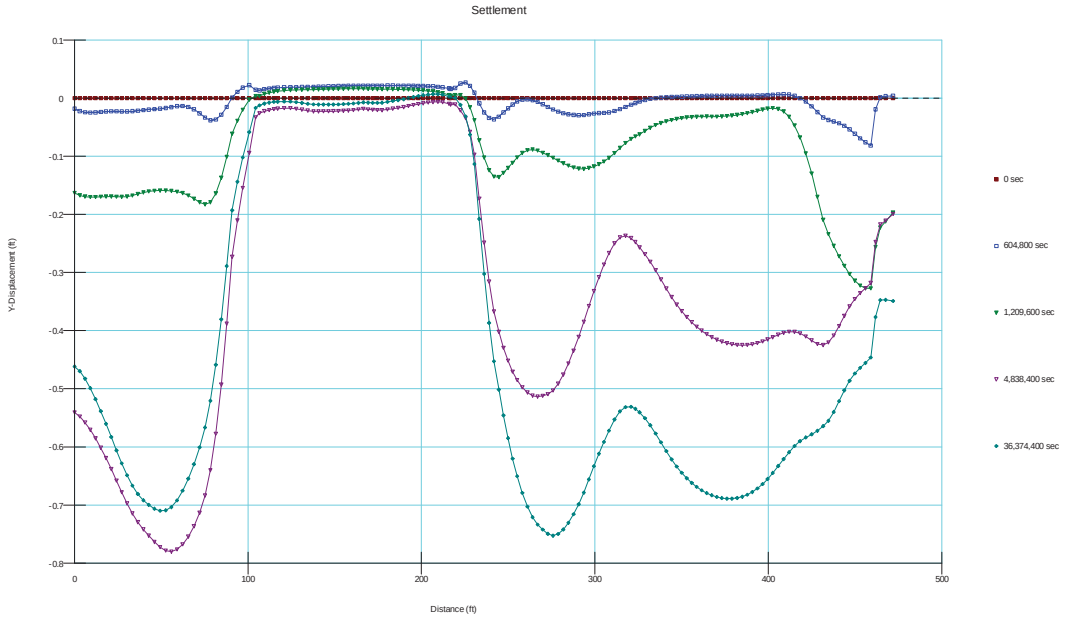
Name: Clay Cap
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 200,000 psf
Unit Weight: 123 pcf
Poisson's Ratio: 0.35

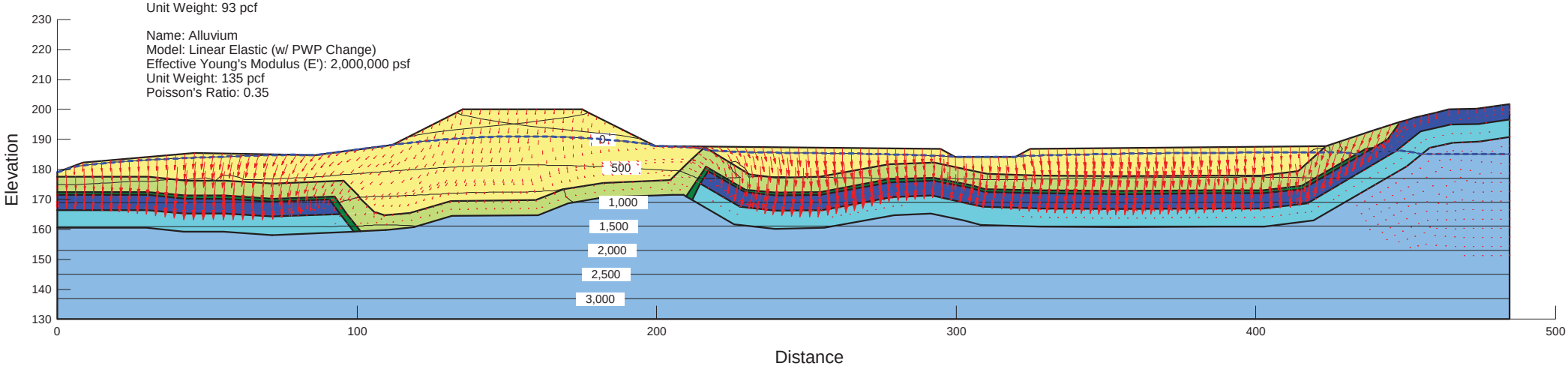
Name: Class 2 AB
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 1,500,000 psf
Unit Weight: 135 pcf
Poisson's Ratio: 0.35

Name: Lake Sediment Layer 2
Model: Soft Clay (MCC w/ PWP Change)
O.C. Ratio: 2.7
Poisson's Ratio: 0.33
Lambda: 0.28
Kappa: 0.022
Initial Void Ratio: 2
Unit Weight: 93 pcf

Name: Lake Sediment Layer 1
Model: Soft Clay (MCC w/ PWP Change)
O.C. Ratio: 3
Poisson's Ratio: 0.33
Lambda: 0.24
Kappa: 0.08
Initial Void Ratio: 2.06
Unit Weight: 93 pcf

Name: Alluvium
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 2,000,000 psf
Unit Weight: 135 pcf
Poisson's Ratio: 0.35





Almaden Lake Improvements Project
Alternative 7 Station 10+00
Settlement Profile

Name: Levee Fill
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 280,000 psf
Unit Weight: 127 pcf
Poisson's Ratio: 0.35

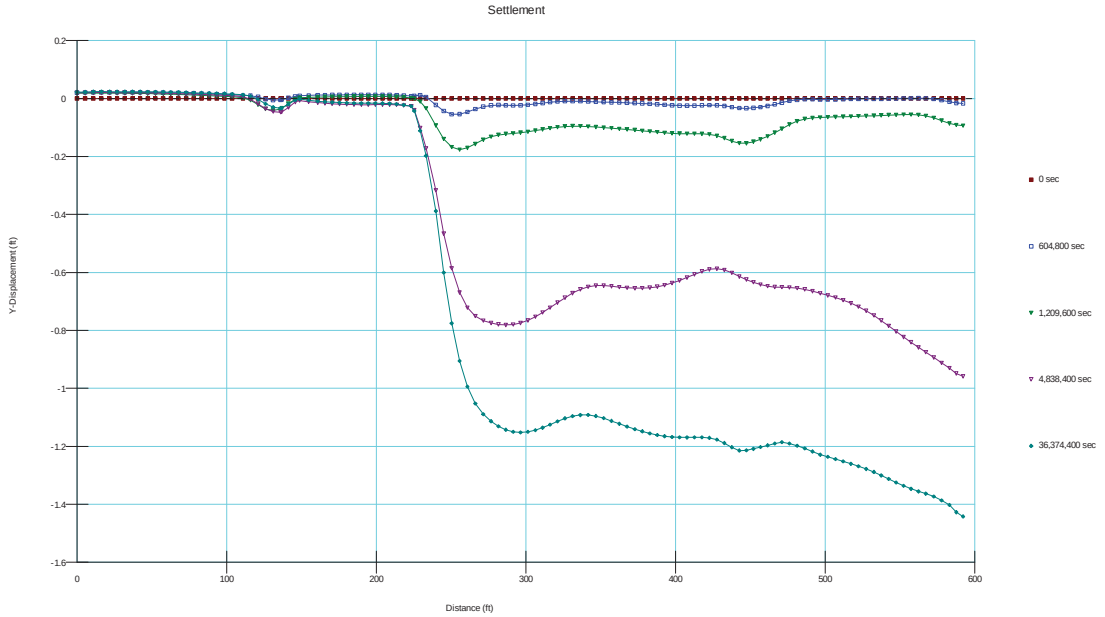
Name: Lake Sediment Layer 2
Model: Soft Clay (MCC w/ PWP Change)
O.C. Ratio: 2.7
Poisson's Ratio: 0.33
Lambda: 0.28
Kappa: 0.022
Initial Void Ratio: 2
Unit Weight: 93 pcf

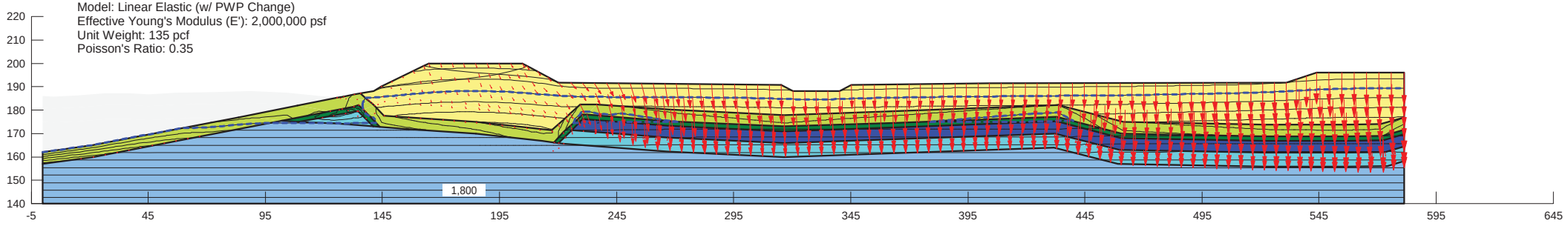
Name: Lake Sediment Layer 1
Model: Soft Clay (MCC w/ PWP Change)
O.C. Ratio: 3
Poisson's Ratio: 0.33
Lambda: 0.24
Kappa: 0.08
Initial Void Ratio: 2.06
Unit Weight: 93 pcf

Name: Clay Cap
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 200,000 psf
Unit Weight: 123 pcf
Poisson's Ratio: 0.35

Name: Class 2 AB
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 1,500,000 psf
Unit Weight: 135 pcf
Poisson's Ratio: 0.35

Name: Alluvium
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 2,000,000 psf
Unit Weight: 135 pcf
Poisson's Ratio: 0.35





Almaden Lake Improvements Project
Alternative 7 Station 12+00
Settlement Profile

Name: Levee Fill
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 280,000 psf
Unit Weight: 127 pcf
Poisson's Ratio: 0.35

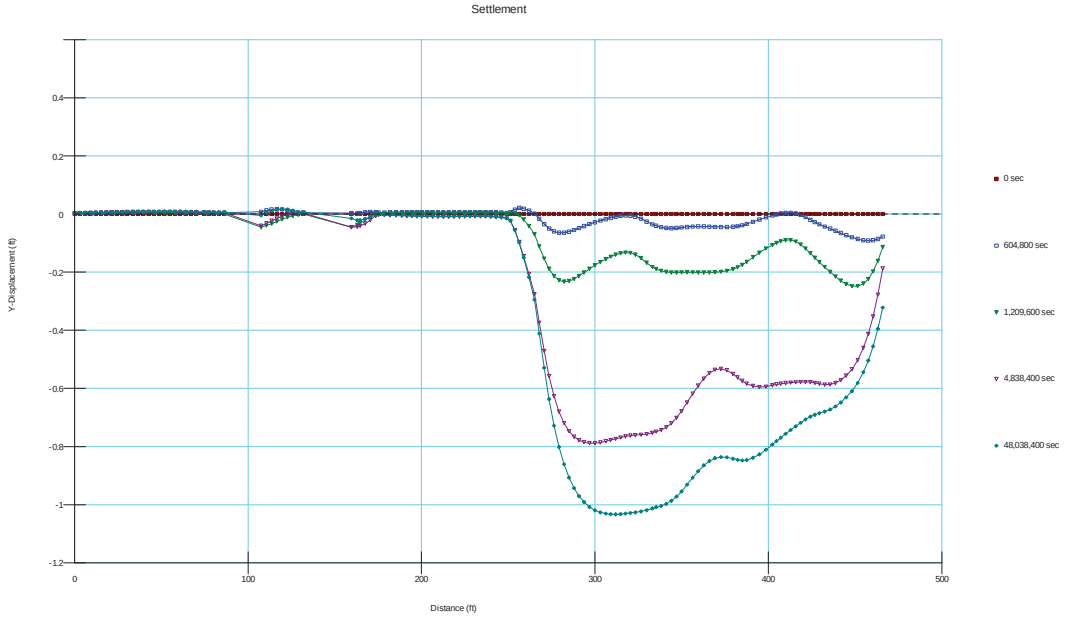
Name: Clay Cap
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 200,000 psf
Unit Weight: 123 pcf
Poisson's Ratio: 0.35

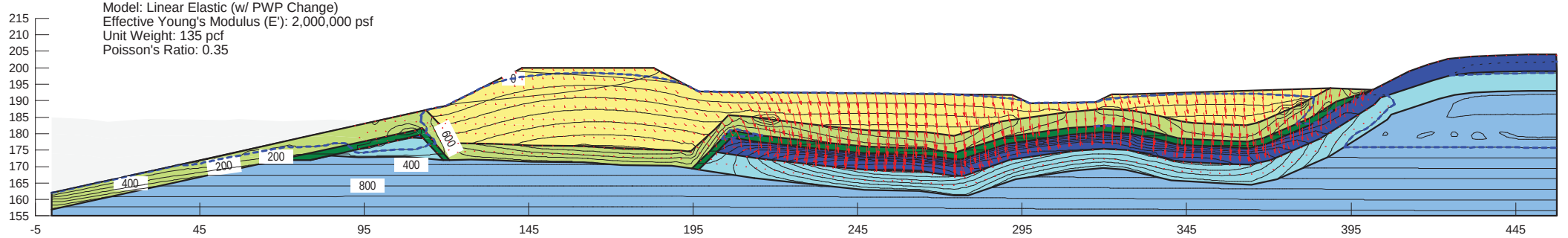
Name: Aggregate Base
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 1,500,000 psf
Unit Weight: 135 pcf
Poisson's Ratio: 0.35

Name: Lake Sediment Layer 1
Model: Soft Clay (MCC w/ PWP Change)
O.C. Ratio: 3
Poisson's Ratio: 0.33
Lambda: 0.24
Kappa: 0.08
Initial Void Ratio: 2.06
Unit Weight: 93 pcf

Name: Lake Sediment Layer 2
Model: Soft Clay (MCC w/ PWP Change)
O.C. Ratio: 2.7
Poisson's Ratio: 0.33
Lambda: 0.28
Kappa: 0.022
Initial Void Ratio: 2
Unit Weight: 93 pcf

Name: Alluvium
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 2,000,000 psf
Unit Weight: 135 pcf
Poisson's Ratio: 0.35





CE&G
CAL ENGINEERING & GEOLOGY

Project: Almaden Lake Improvements | Project No.: 140546 | Sheet: ____ of ____
Item: Time rate of Settlement | Designer: E. Zaw | Date: 12/16/14
Double Drainage | Checker: ____ | Date: ____

Lake Sediment Time until 95% settlement due to Consolidation

$T_v = \frac{C_v t}{H^2}$

$T_v = 1.129$ for 95%
$H = 11'$
$C_{v_{WB-1L}} = 14.86 \frac{ft^2}{yr}$
$C_{v_{WB-1U}} = 75.42 \frac{ft^2}{yr}$
$C_{v_{WB-2L}} = 166 \frac{ft^2}{yr}$
$C_{v_{WB-2U}} = 283 \frac{ft^2}{yr}$

WB-1

$t = \frac{T_v H^2}{C_v}$

$t_L = \frac{1.129(5.5^2)}{14.86} = 2.3$ yrs 0.47

$t_U = \frac{1.129(5.5^2)}{75.42} = 0.45$ yrs 0.09

WB-2

$t_L = \frac{1.129(5.5)^2}{166} = 0.21$ yrs 0.06

$t_U = \frac{1.129(5.5)^2}{283} = 0.12$ yrs 0.036

0.53 – 6.5 month
0.126 – 1.5 month

Reorder From NEBS CUSTOM printing service 1-800-225-6327 NEBS, Inc. Peterborough, NH 03458 www.nebs.com

Ref. No: G 356802744

WB-1

$C_c = \frac{\varepsilon_2 - \varepsilon_1}{(\log \sigma'_2)_2 - (\log \sigma'_2)_1}(1+e_o)$ = compression index

$= \frac{0.3252 - 0.1376}{\log(8,800) - \log(800)}(1+2.064) = 0.552$

$C_c = 0.552$

$C_c = \frac{PI}{74} = \frac{19}{74}$

$C_c = 0.257$

$C_c' = \frac{C_c}{1+e_o}$ = compression ratio

$C_c' = 0.18$

$C_r = \frac{\varepsilon_2 - \varepsilon_1}{(\log \sigma'_2)_2 - (\log \sigma'_2)_1}(1+e_o)$ = recompression index

$= \frac{0.0596 - 0.0314}{\log(150) - \log(50)}(1+2.064)$

$C_r = 0.181$

$C_r = \frac{I_p}{370} = \frac{19}{370}$

$C_r = 0.05$

$C_r' = \frac{C_r}{1+e_o}$ = recompression ratio

$C_r' = 0.059$

$C_v \Rightarrow$ See Cooper Testing Spreadsheet (Data Entry Tab)

Load #	Load (psf)	C_v (ft^2/yr)	
6	1,100	34.01	✓
7	1,600	38.74	✓
8	2,200	14.86	✓
9	4,400	38.07	✓
10	8,800	56.38	✓
11	17,600	75.42	✓

WB-1
LL = 45
PL = 26
PI = 19

LL %	C_v ft^2/yr	
30	20 to 360	
40	12 to 230	✓
50	8 to 150	
60	5 to 90	
70	3 to 58	

Terzaghi & Peck, 1967

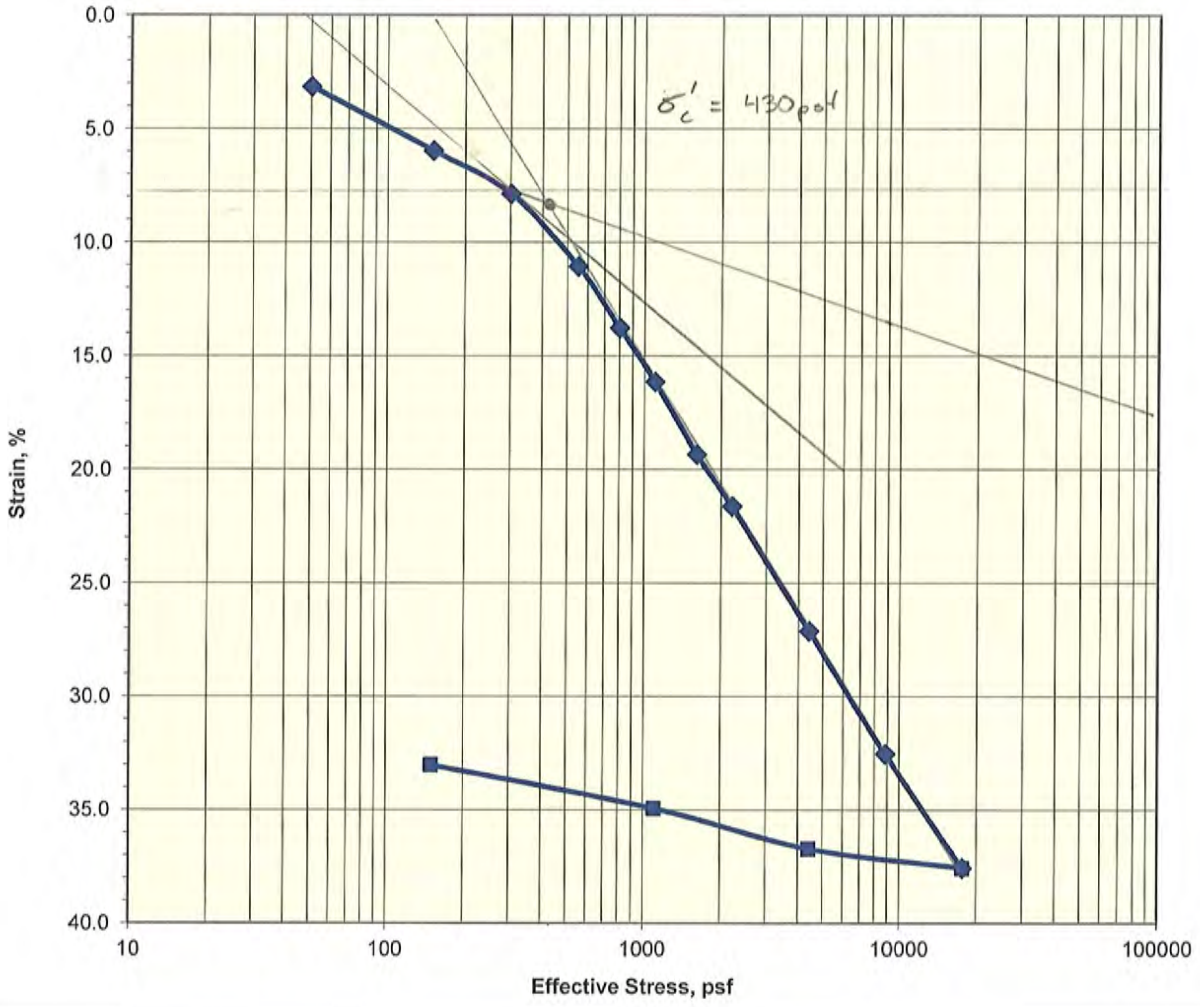
Reorder From NEBS CUSTOM printing service 1-800-225-6327 NEBS, Inc. Peterborough, NH 03458 www.nebs.com

Ref. No: G 356802744

Consolidation Test
ASTM D2435

Job No.:	471-120	Boring:	WB-1	Run By:	MD
Client:	Cal Engineering & Geology	Sample:	1-3	Reduced:	PJ
Project:	Almaden - 140540	Depth, ft.:	5(Tip-5")	Checked:	PJ/DC
Soil Type:	Dark Gray Lean CLAY w/ Sand			Date:	11/4/2014

Strain-Log-P Curve



Assumed Gs 2.7	Initial	Final
Moisture %:	71.7	35.9
Dry Density, pcf:	55.0	85.5
Void Ratio:	2.064	0.971
% Saturation:	93.8	100.0

Remarks:

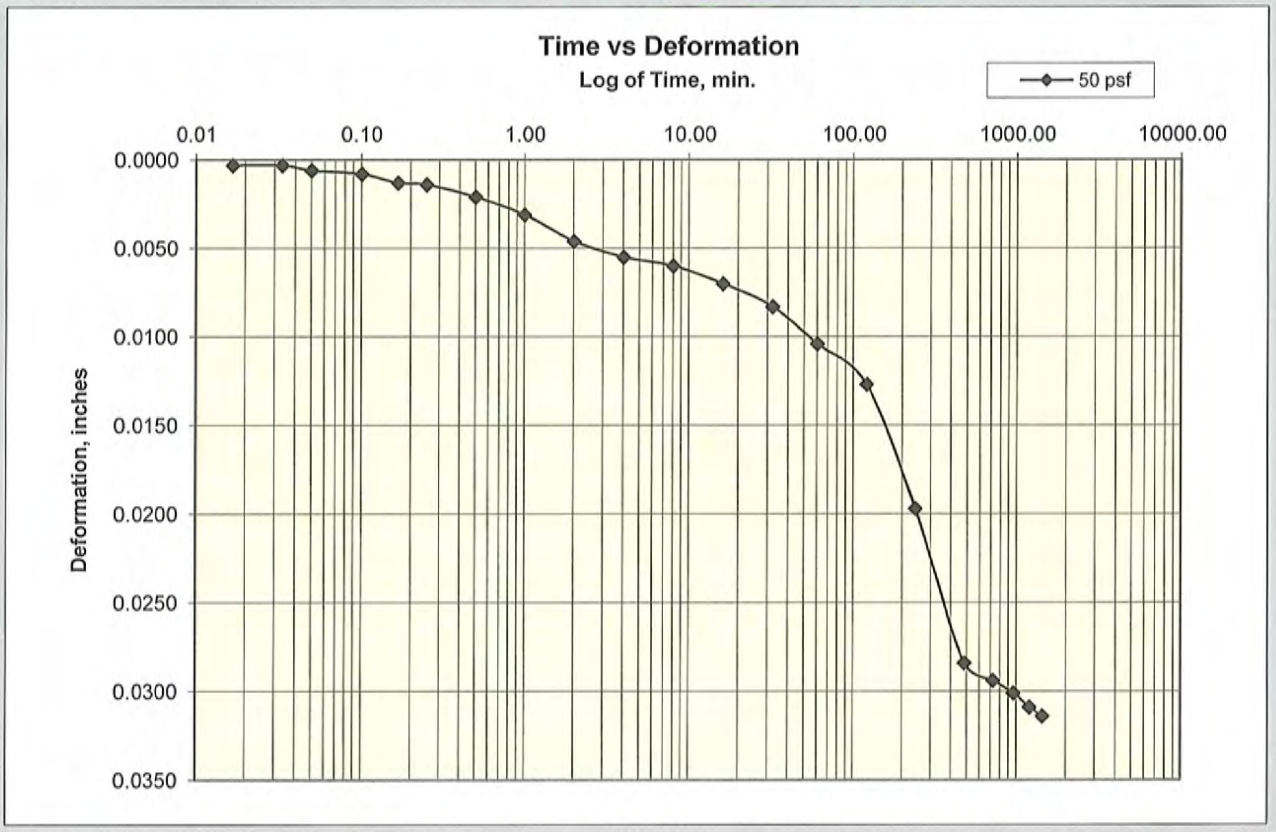
C_c = 0.552 C_c' = 0.18 C_v = 0.004 → 0.021

C_r = 0.181 C_r' = 0.059

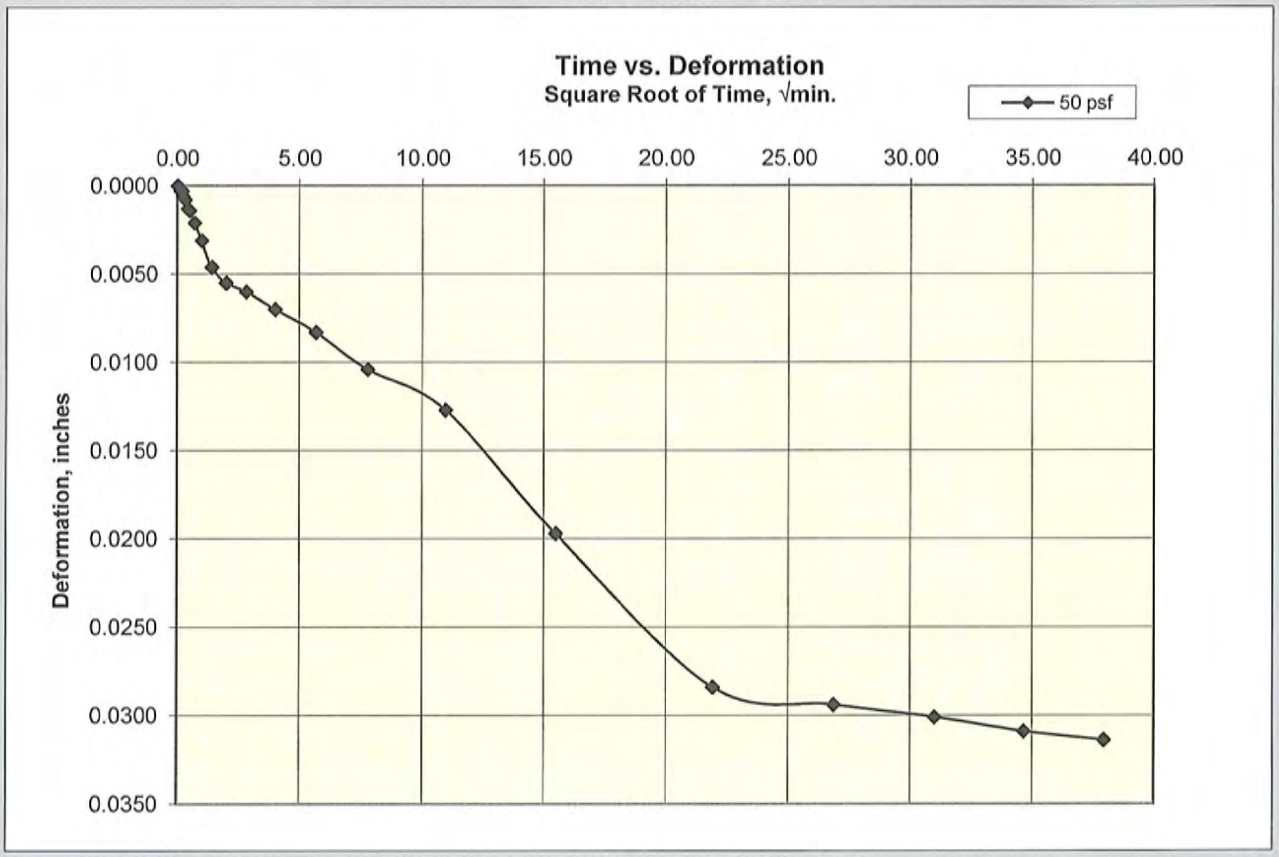
$OCR = \frac{430}{138} = 3$ = Lightly overconsolidated

Cooper Testing Labs, Inc.

Load 1 | 50 psf

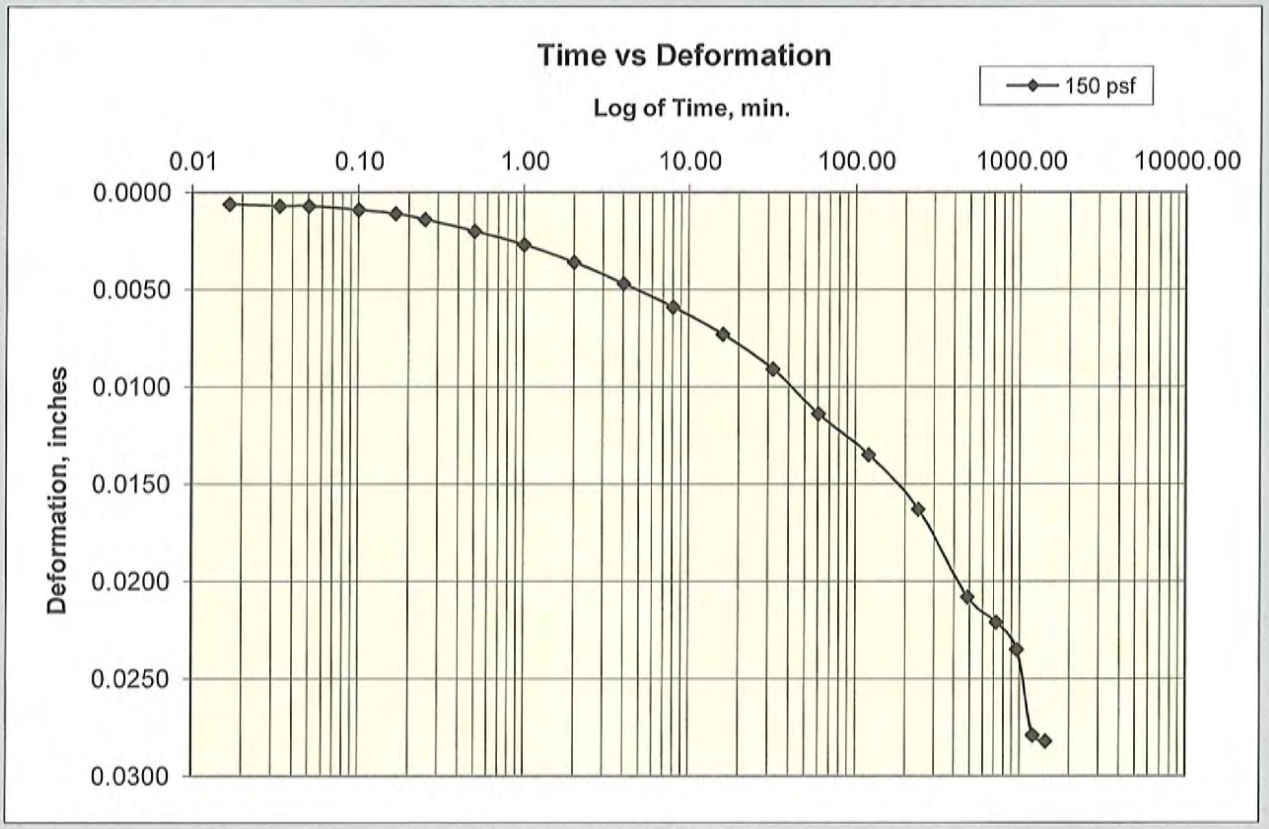


50 psf

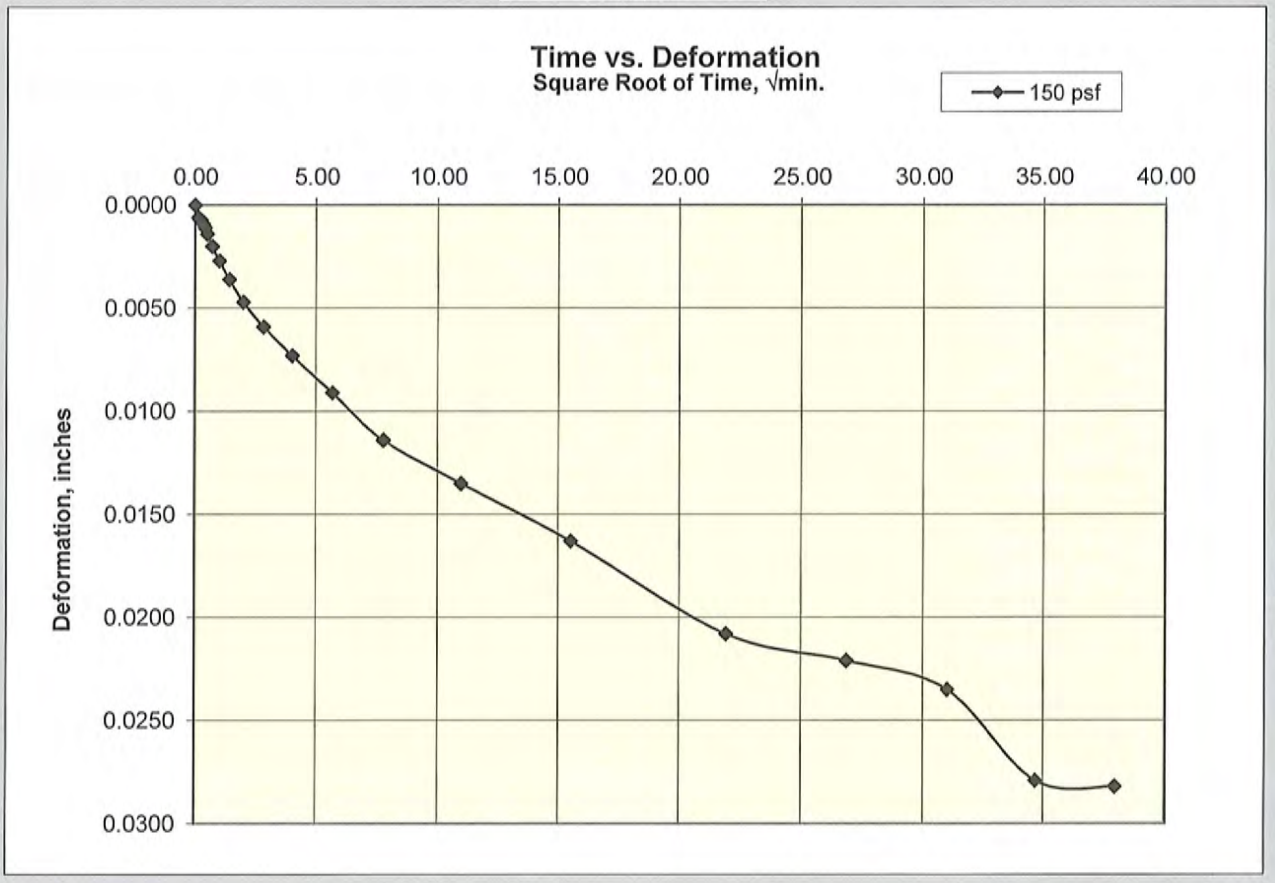


Cooper Testing Labs, Inc.

Load 2 | 150 psf

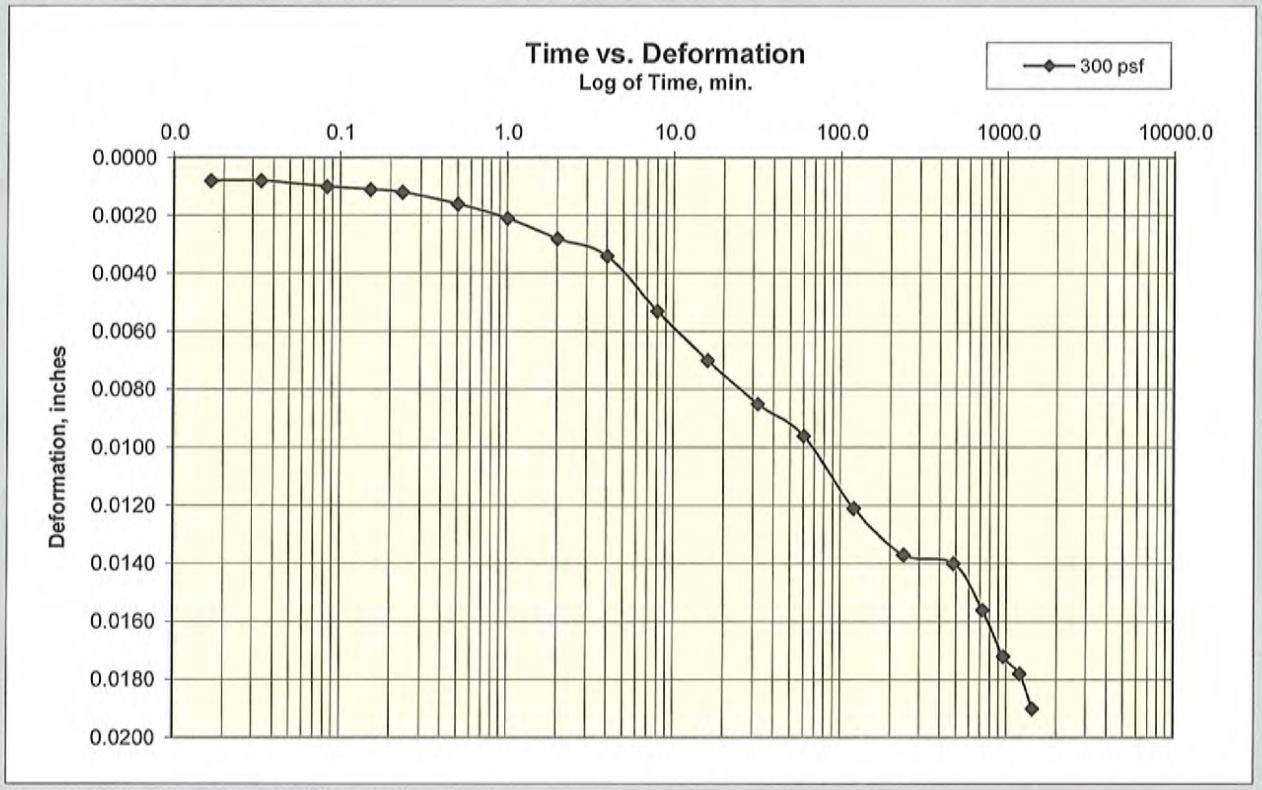


150 psf

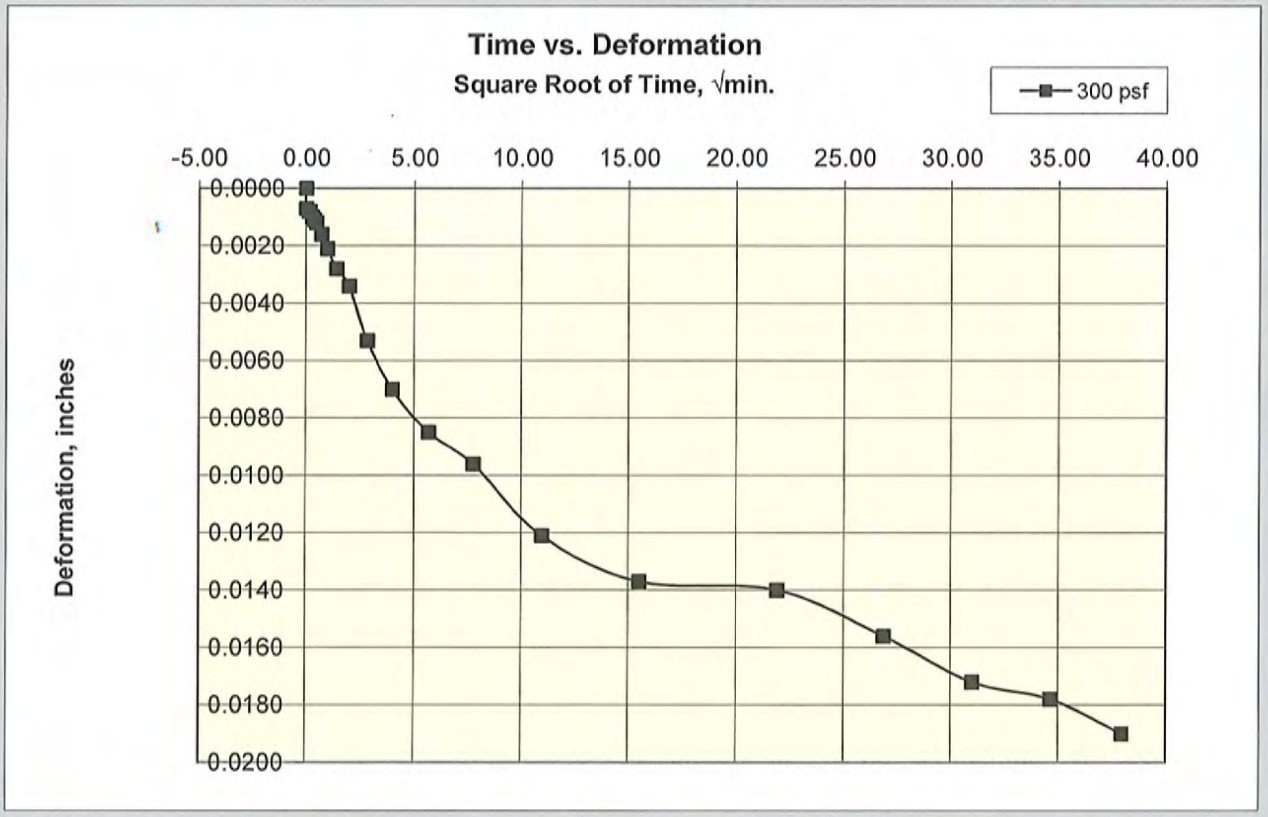


Load 3

300 psf

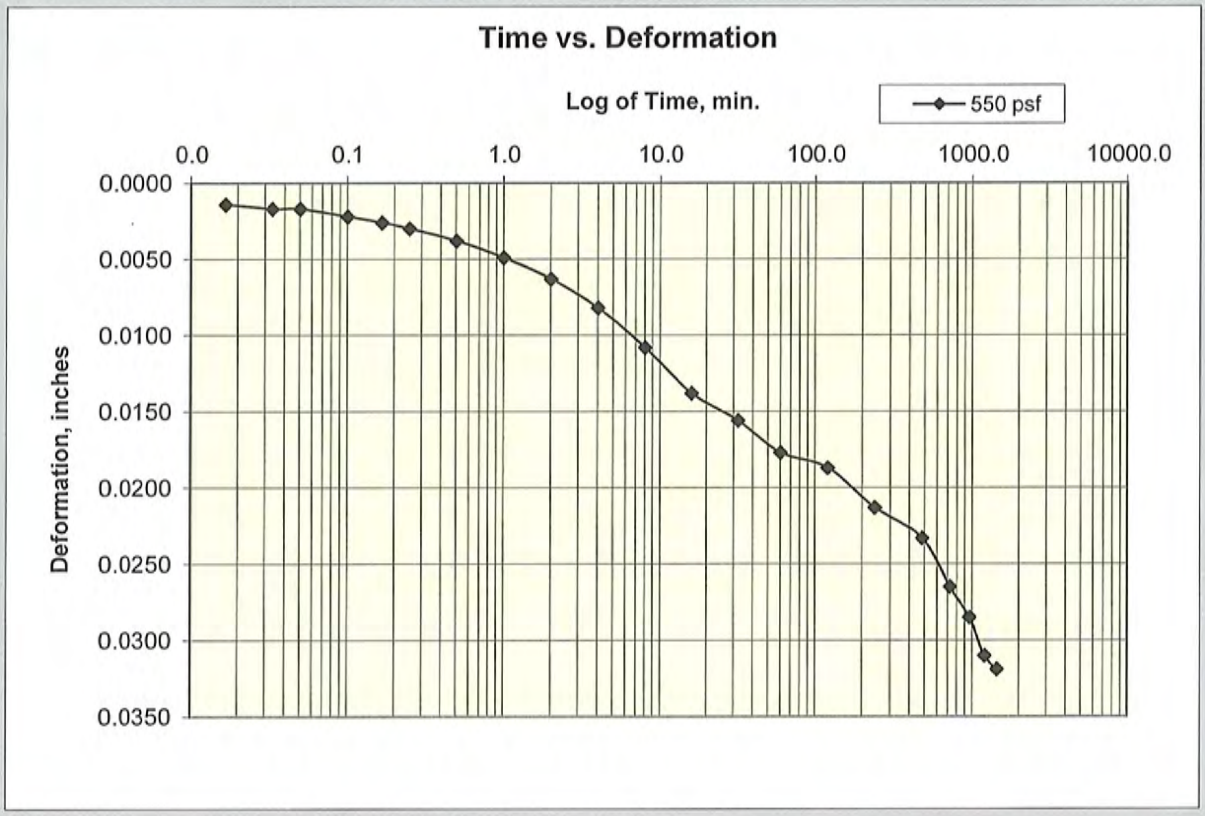


300 psf

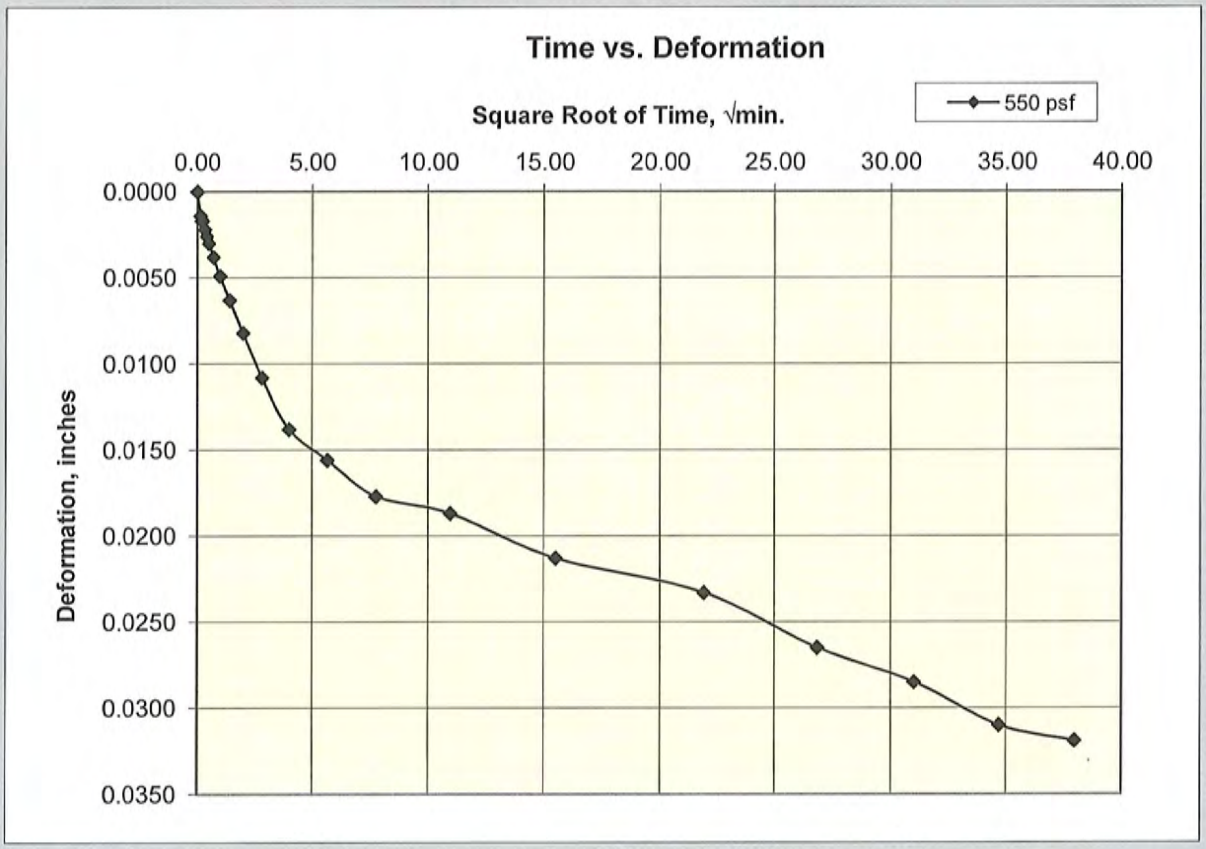


Cooper Testing Labs, Inc.

Load 4 | 550 psf

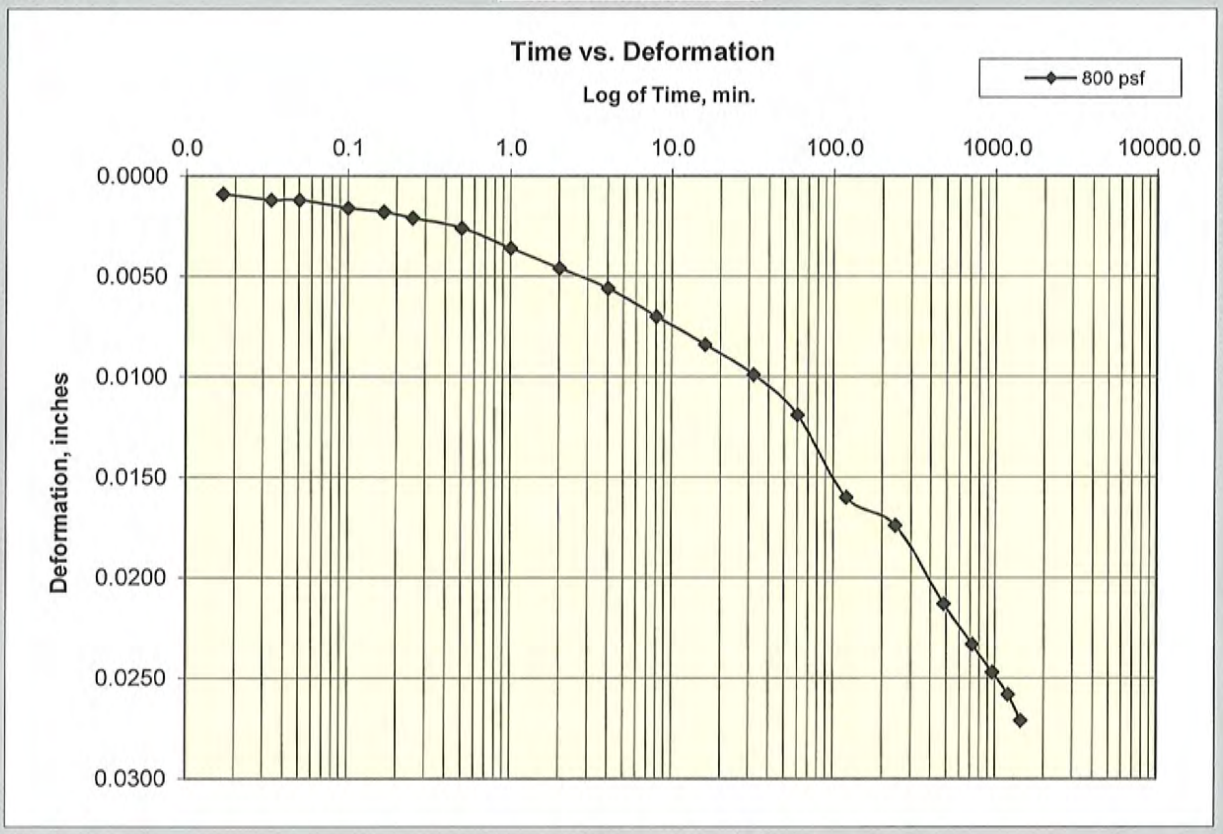


550 psf

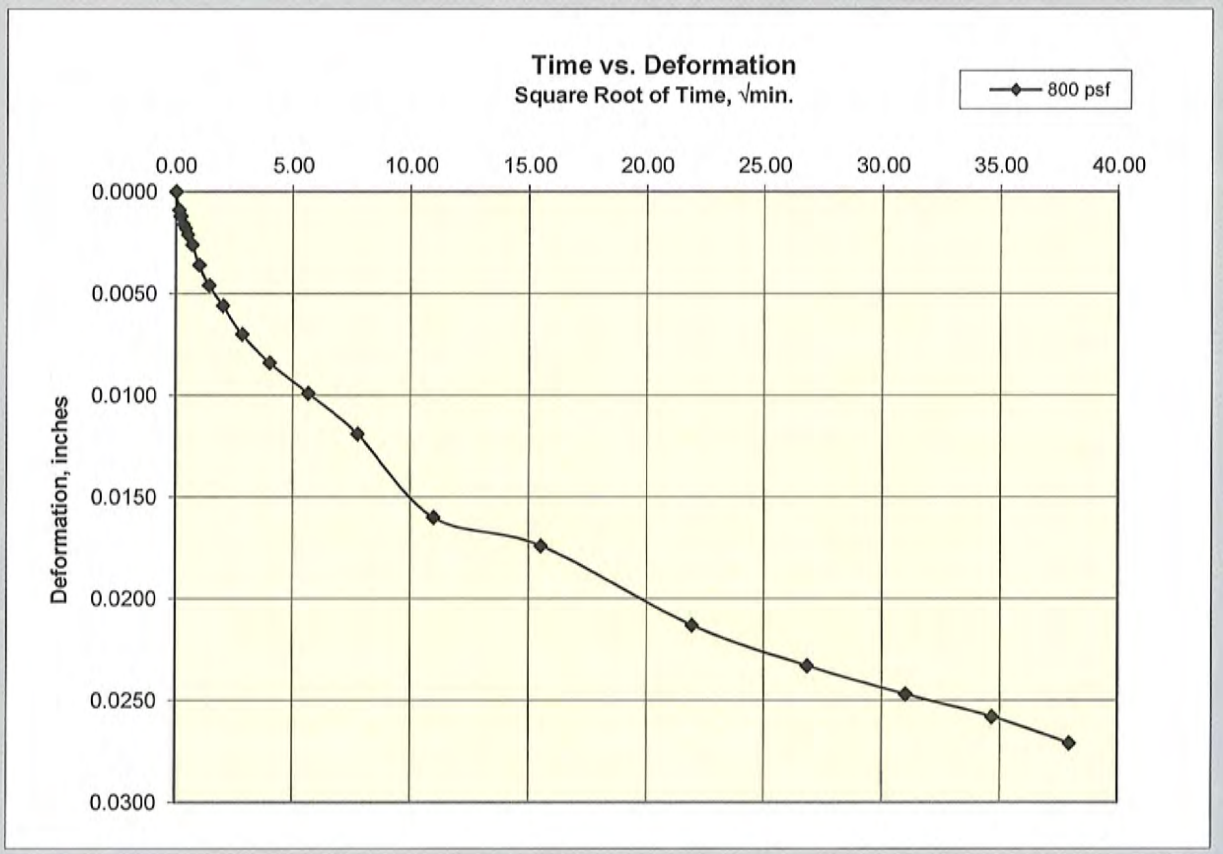


Cooper Testing Labs, Inc.

Load 5 | 800 psf

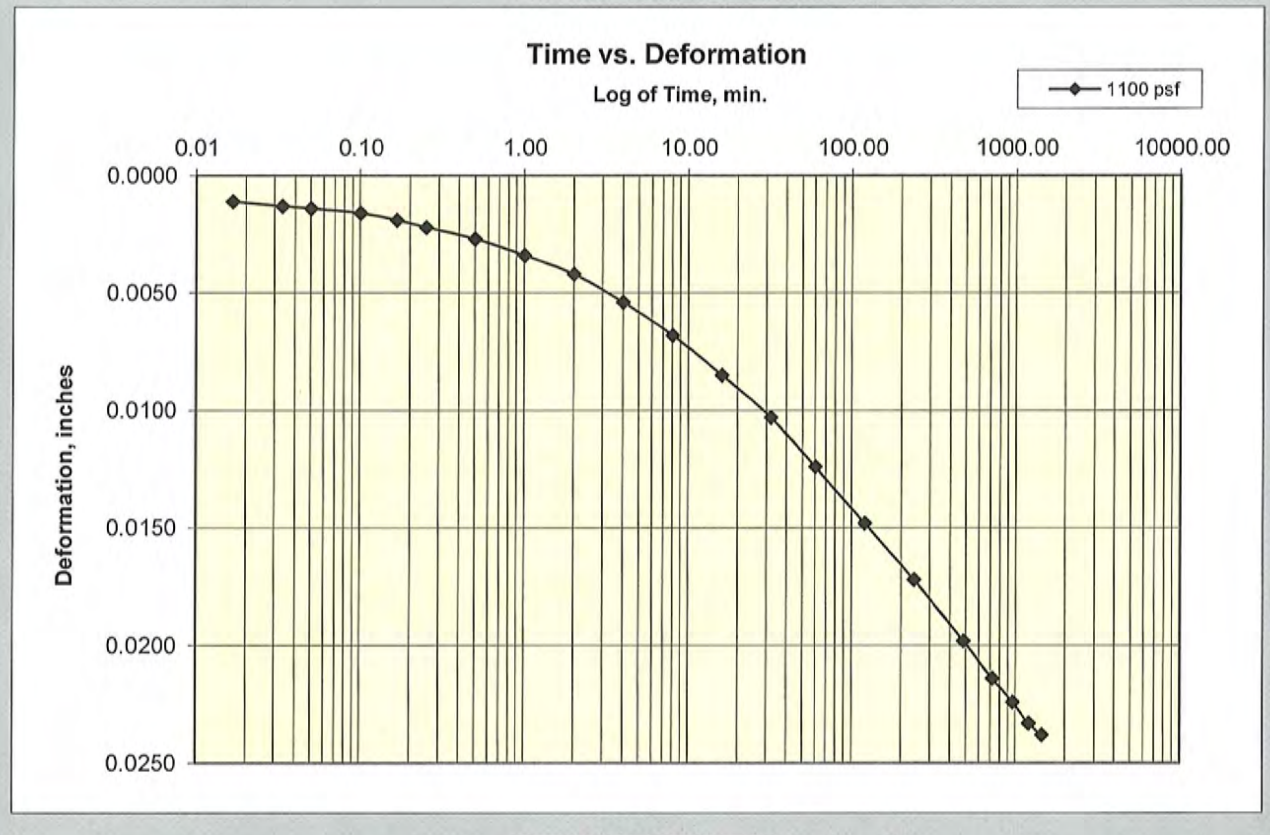


800 psf

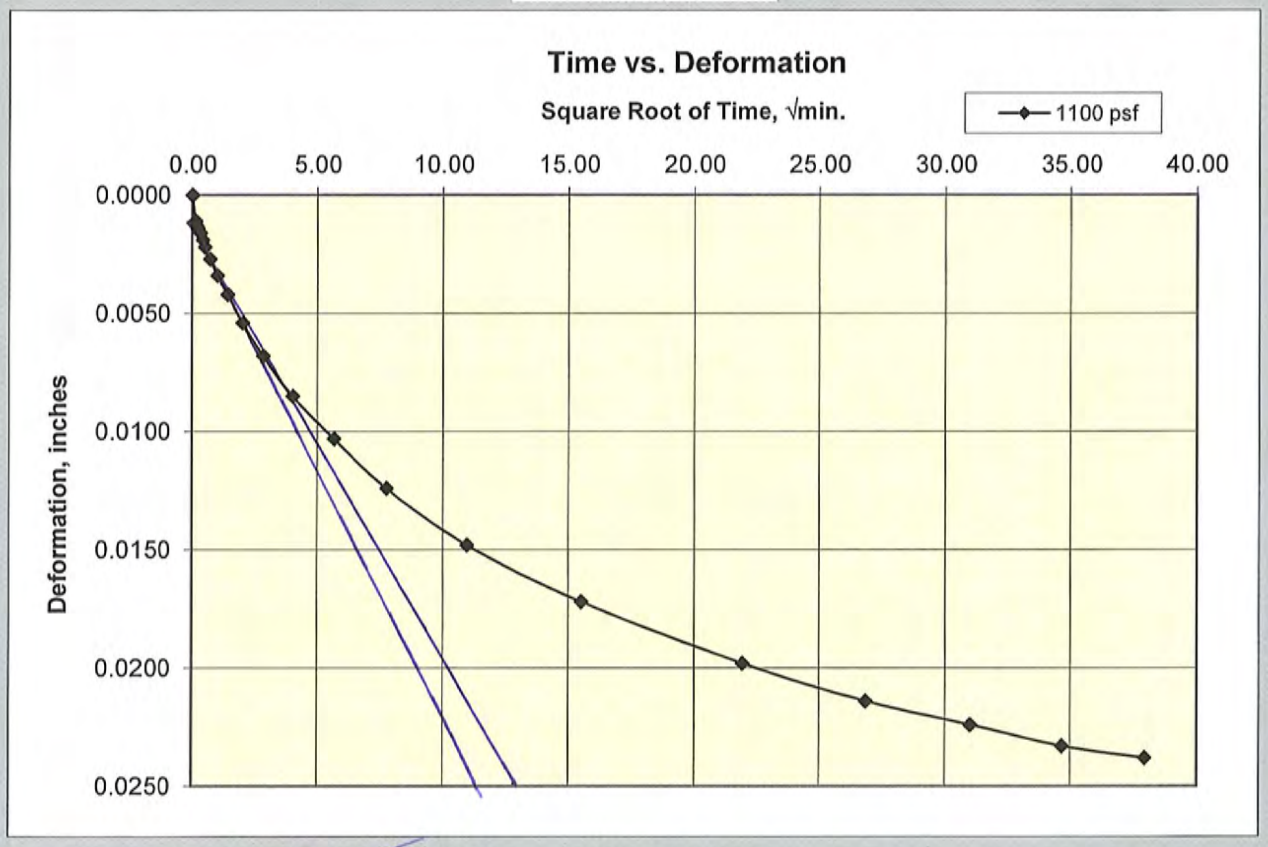


Load 6

1100 psf



1100 psf



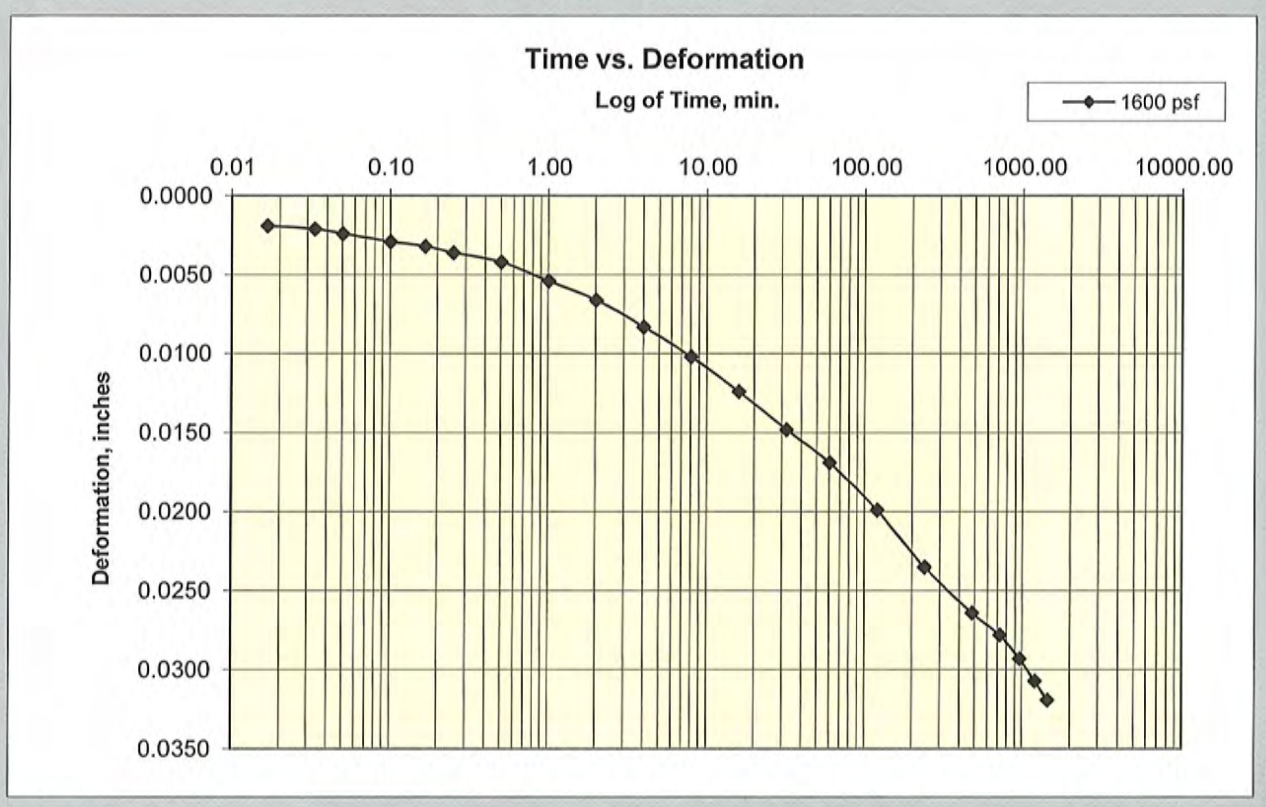
$\sqrt{t_{90}} = \sqrt{4}$

$t_{90} = 16\,min$

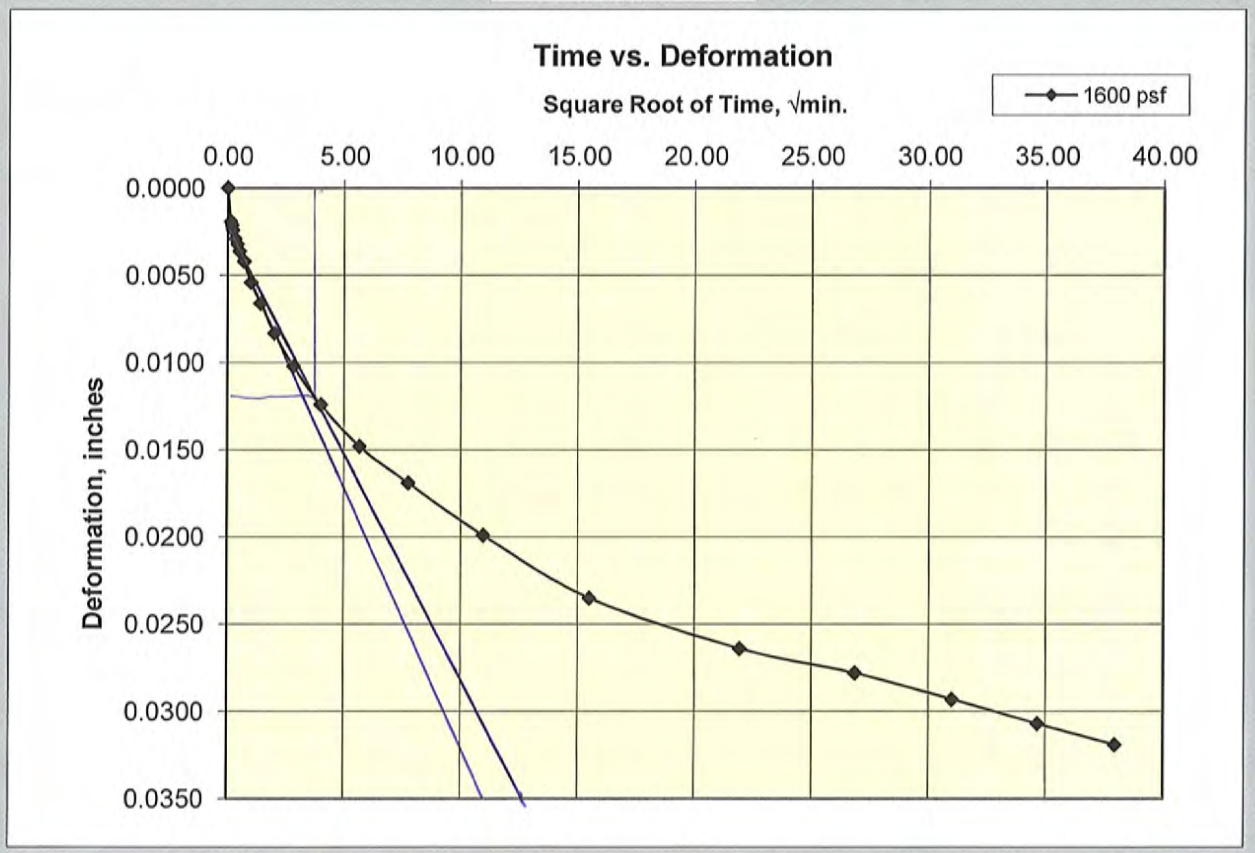
Cooper Testing Labs, Inc.

Load 7

1600 psf



1600 psf

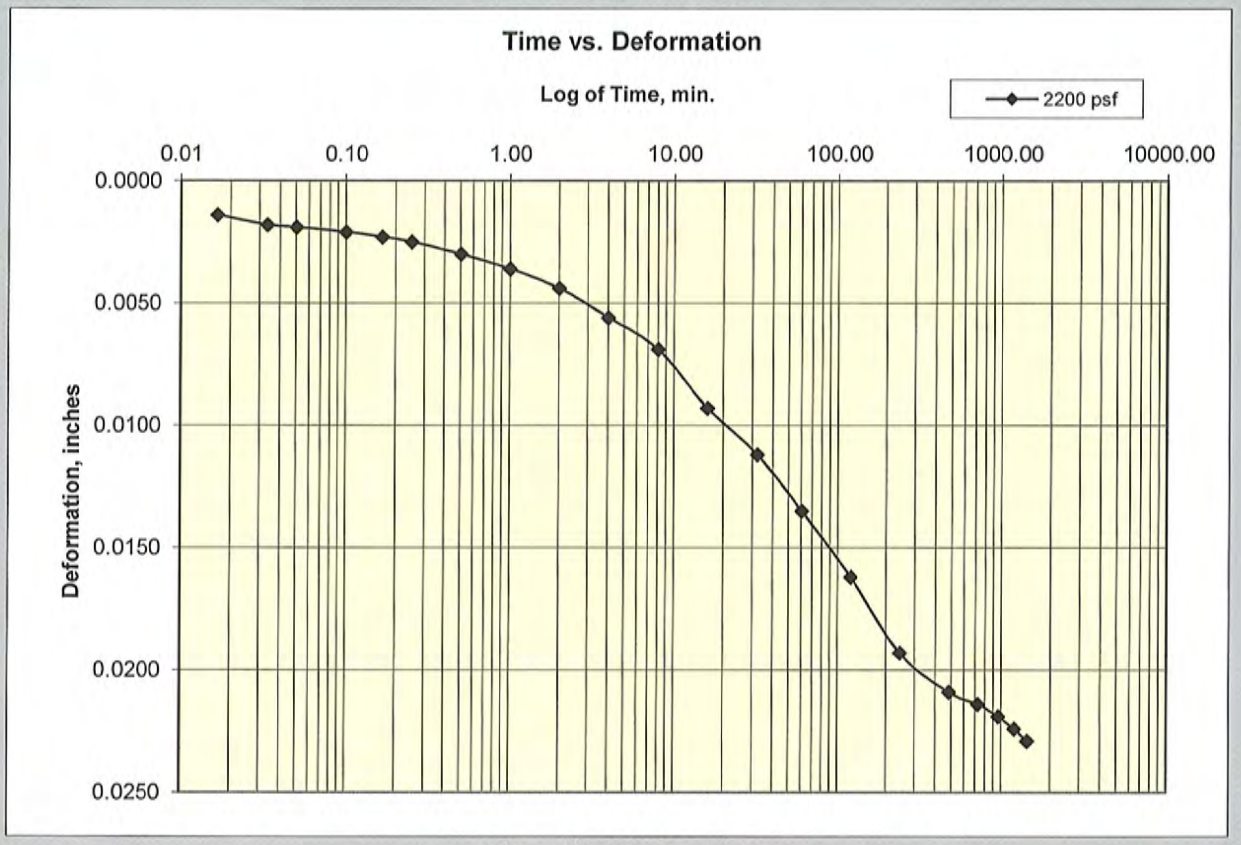


$\sqrt{t_{90}} = \sqrt{3.6}$ min

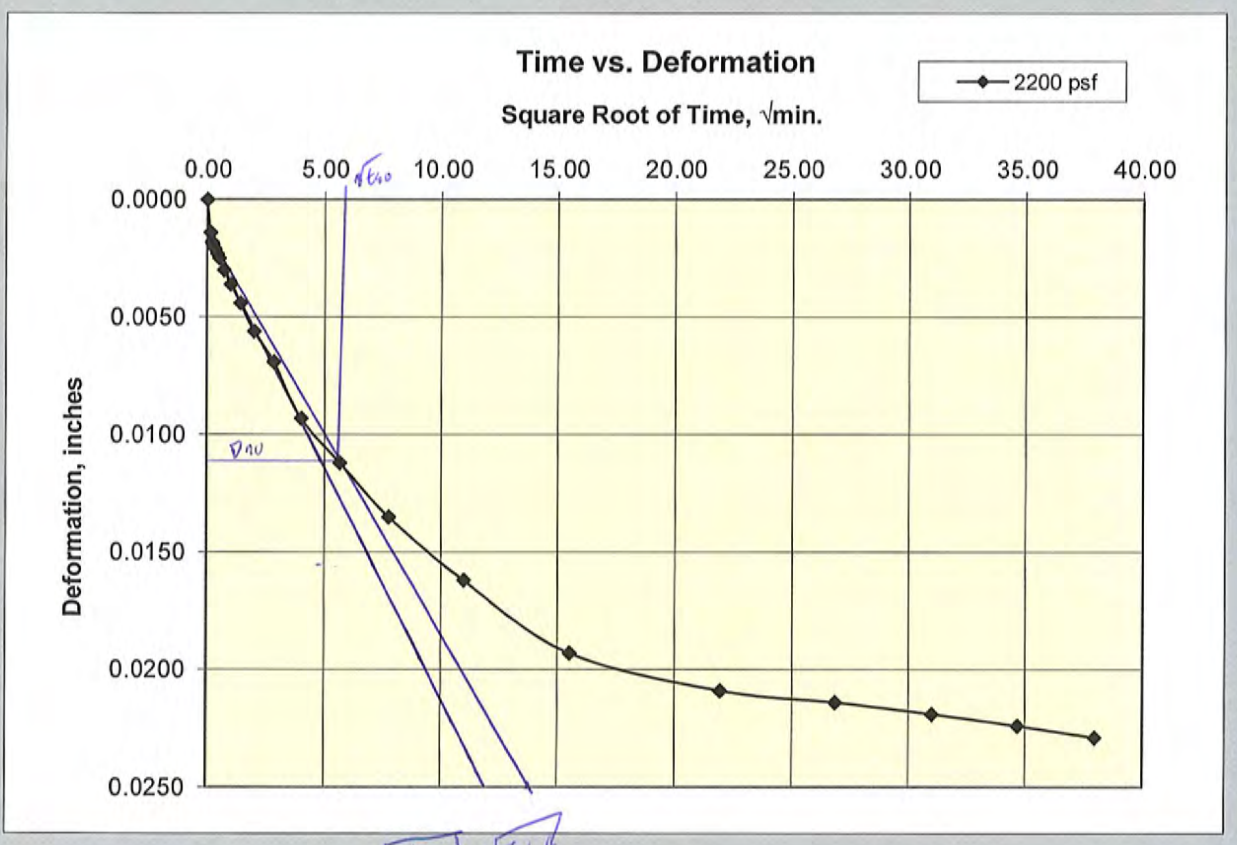
$t_{90} = 13$ min

Cooper Testing Labs, Inc.

Load 8 | 2200 psf



2200 psf

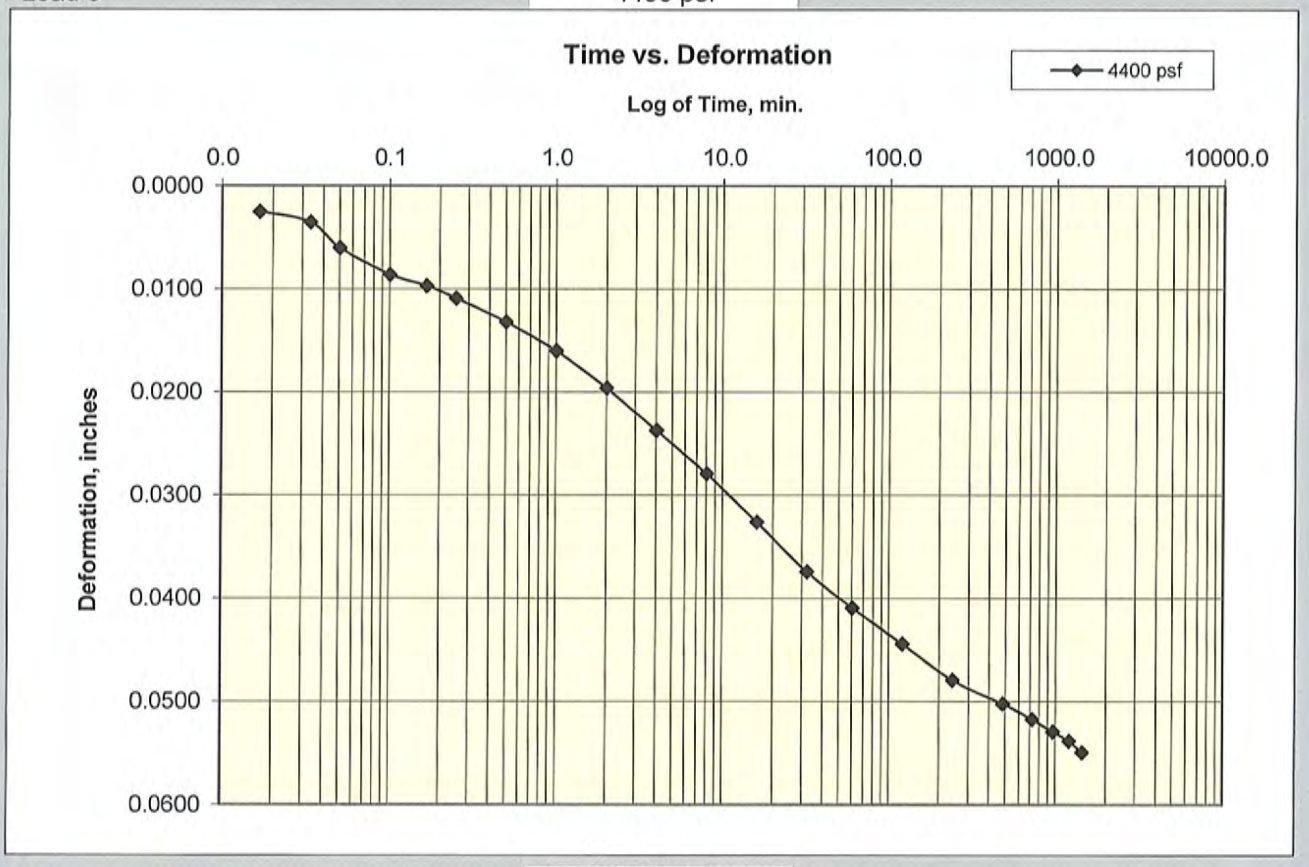


$\sqrt{t_{90}} = \sqrt{5.66}$

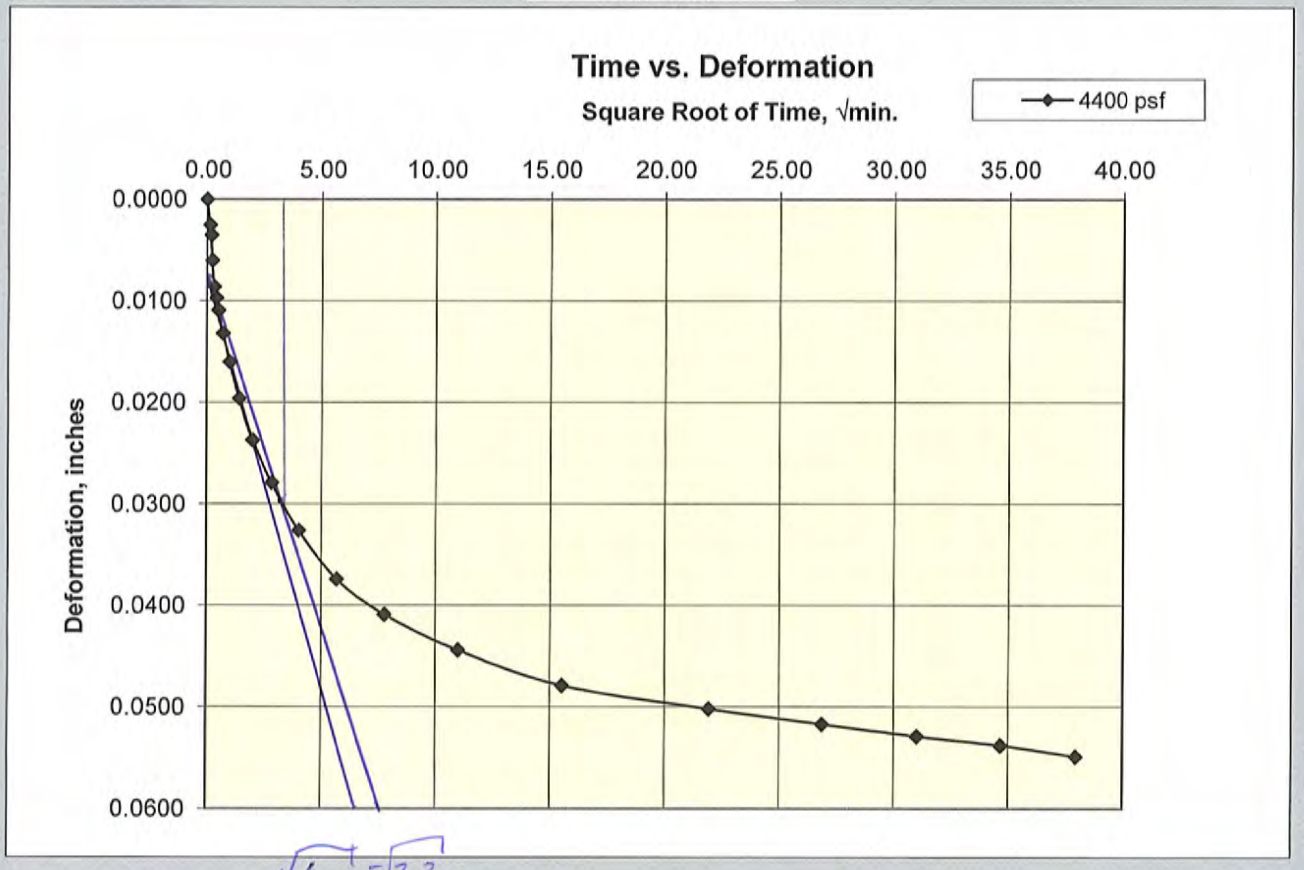
$t_{90} = 32$ min

Cooper Testing Labs, Inc.

Load 9 | 4400 psf



4400 psf

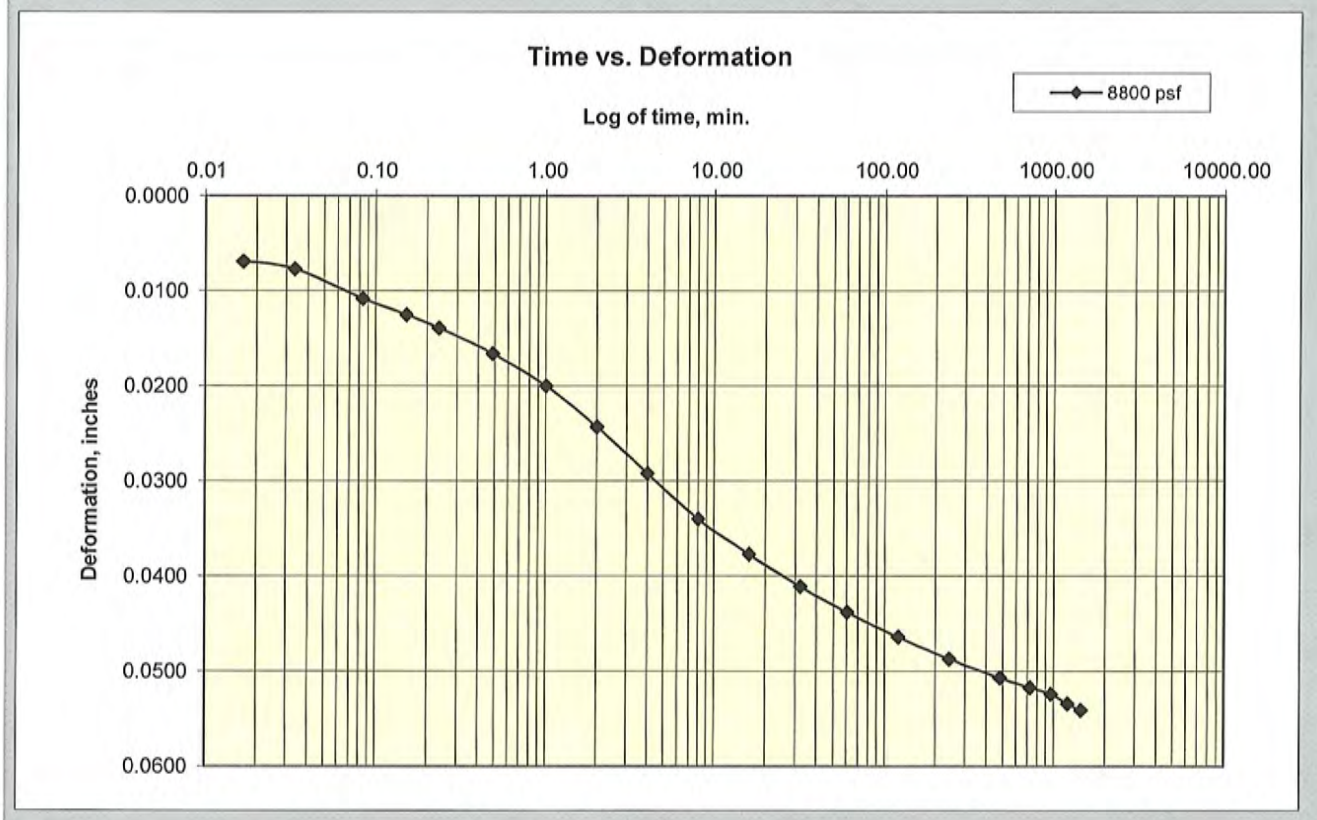


$\sqrt{t_{50}} = 3.3$

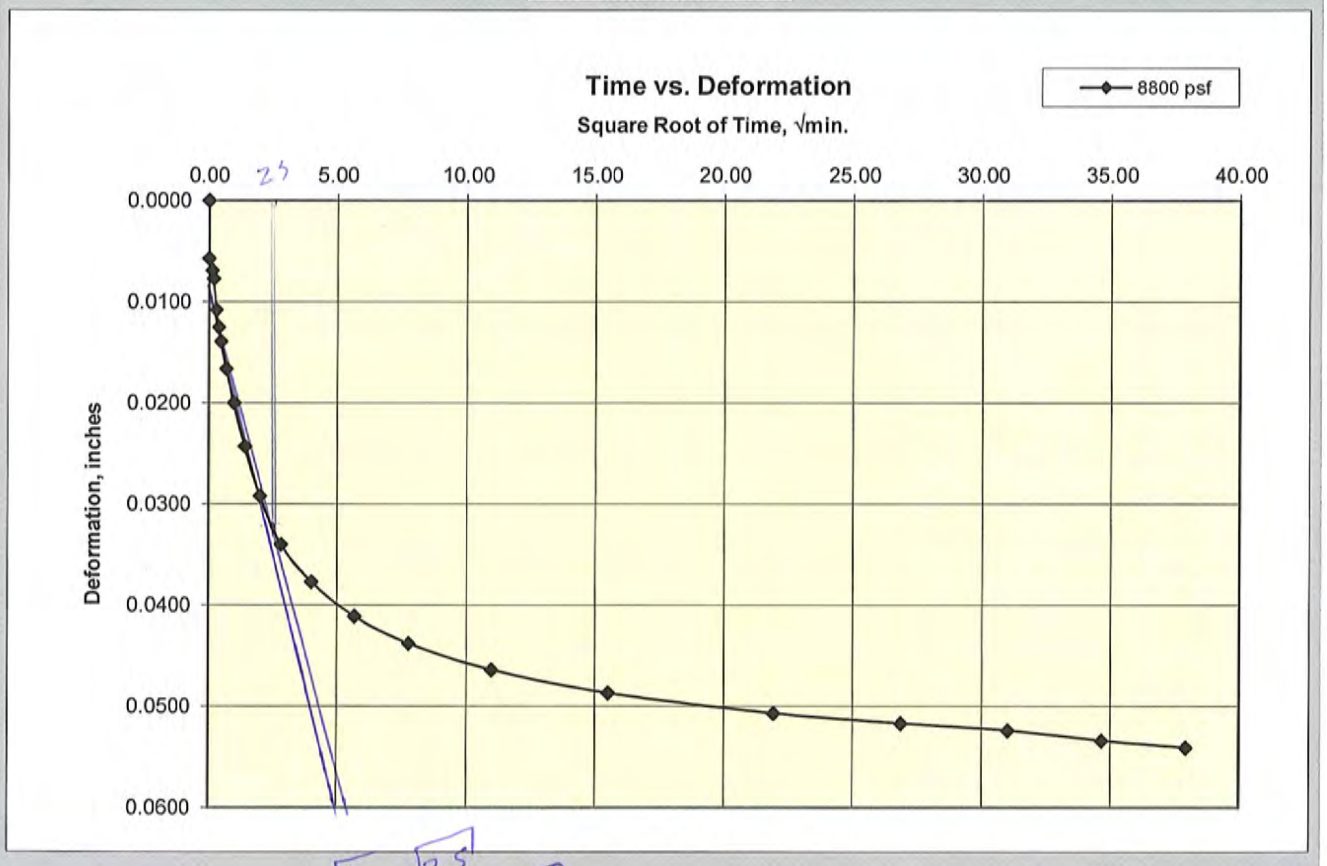
$t_{50} = 10.8$ min

Cooper Testing Labs, Inc.

Load 10 | 8800 psf



8800 psf

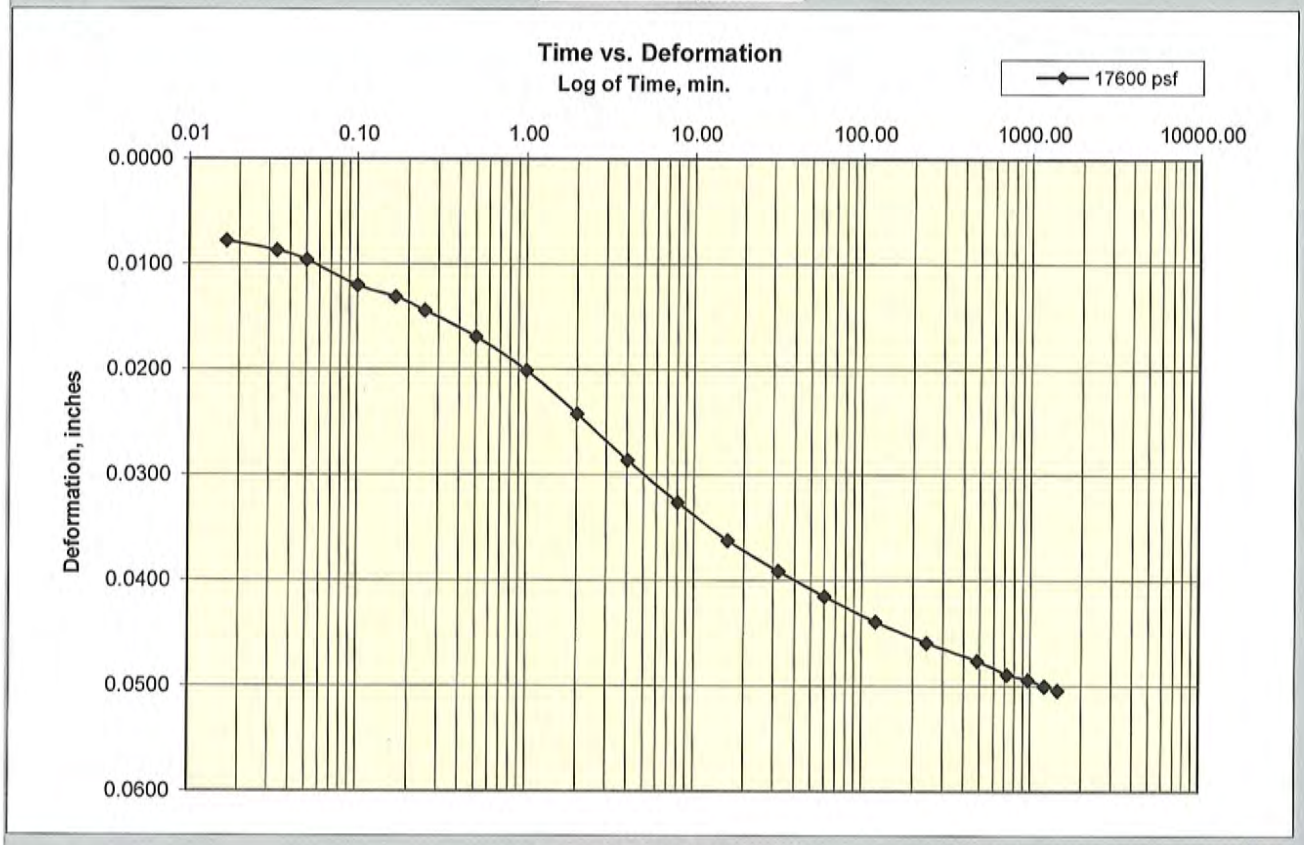


$\sqrt{t_{90}} = 2.5$

$t_{90} = 6.25$ min

Load 11

17600 psf



17600 psf



$\sqrt{t_{90}} = \sqrt{2}_{min}$

$t_{90} = 4_{min}$

CE&G
CAL ENGINEERING & GEOLOGY

Project: Abraham Lake Improvements Project No.: 140546 Sheet: ___ of ___
Item: WB-2 Consolidation Test Designer: E. Zamora Date: 12/8/2014
Checker: ___ Date: ___

WB-2

$C_c = \frac{\varepsilon_2 - \varepsilon_1}{(\log \sigma'_2) - (\log \sigma'_1)_1} (1 + e_o)$ = compression index

$= \frac{0.2709 - 0.1410}{\log(8{,}200\,psf) - \log(2{,}200\,psf)} (1 + 1.998)$

$C_c = 0.647$

$C_c = \frac{PI}{74} = \frac{10}{74}$

$C_c = 0.135$

$C_c' = \frac{C_c}{1 + e_o}$ = compression ratio

$C_c' = 0.216$

$C_r = \frac{\varepsilon_2 - \varepsilon_1}{(\log \sigma'_2) e^{-} (\log \sigma'_c)_1} (1 + e_o)$ = recompression index

$= \frac{0.0058 - 0.0025}{\log(150) - \log(50)} (1 + 1.998)$

$C_r = 0.052$

$C_r = \frac{PI}{370} = \frac{10}{370}$

$C_r = 0.027$

$C_r' = \frac{C_r}{1 + e_o}$ = recompression ratio

$C_r' = 0.0174$

$C_v \Rightarrow$ See Cooper Testing Spreadsheet (Data Entry Tab)

Load #	Load (psf)	C_v ft^2/yr	
5	1,100	639	X
6	2,200	283	✓
7	4,400	166	✓
8	8,800	281	✓
9	17,600	342	?

WB-2 LL = 37
PL = 27
PI = 10

LL %	C_v (ft^2/yr)
30	20 to 360
40	12 to 230
50	4 to 150
60	3 to 96
70	3 to 58
80	2 to 36
90	1 to 23

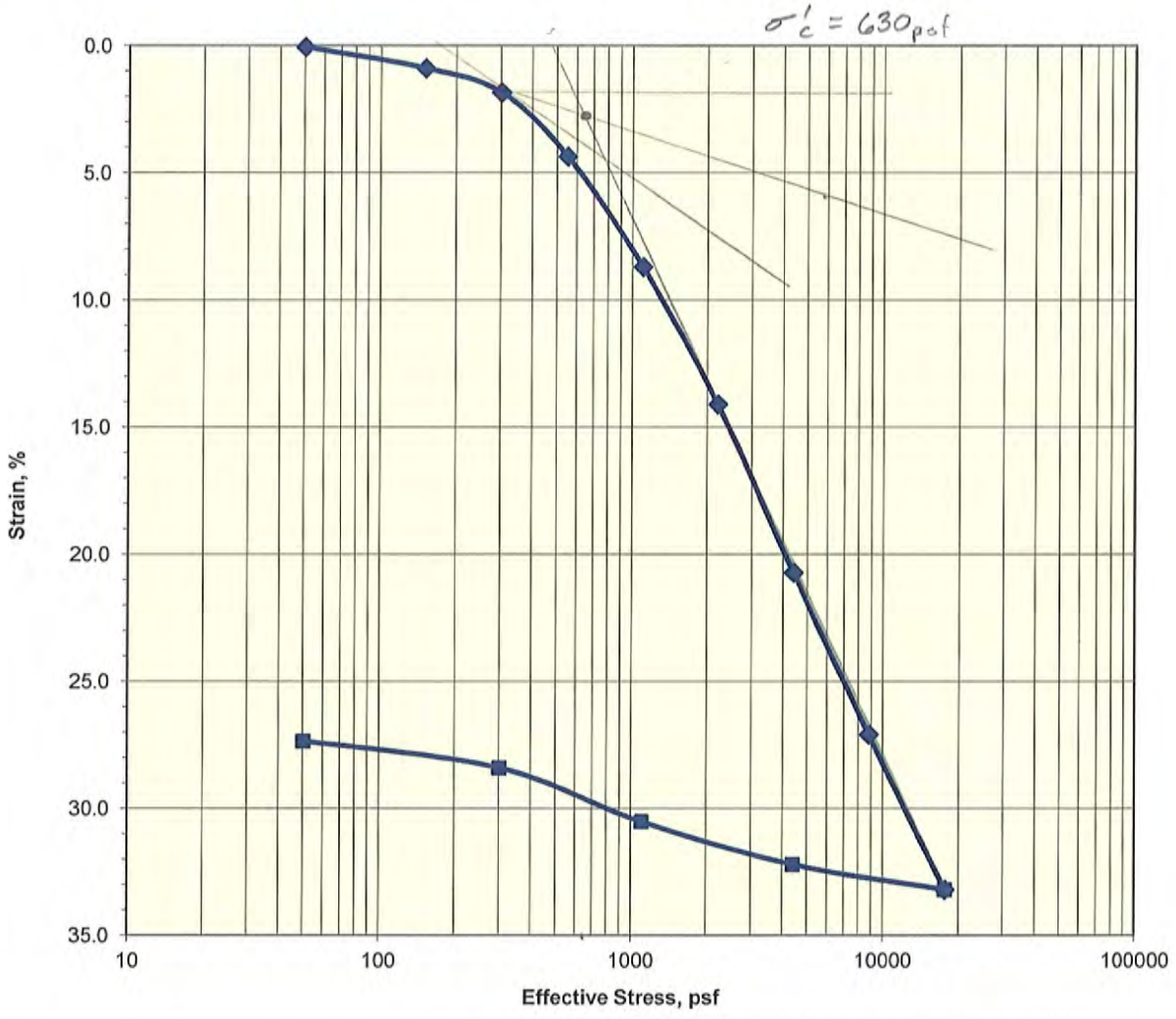
Terzaghi & Peck 1967

Reorder From NEBS CUSTOM™ printing service 1-800-388-6327 NEBS, Inc. Peterborough, NH 03458 www.nebs.com Ref. No: G 356802744

Consolidation Test
ASTM D2435

Job No.:	471-120	Boring:	WB-2	Run By:	MD
Client:	Cal Engineering & Geology	Sample:	2-3	Reduced:	PJ
Project:	Almaden - 140540	Depth, ft.:	6-8 (8-10 Tip-4")	Checked:	PJ/DC
Soil Type:	Dark Gray Organic Silty SAND			Date:	11/3/2014

Strain-Log-P Curve



Assumed Gs 2.65	Initial	Final
Moisture %:	68.9	40.4
Dry Density, pcf:	55.2	79.9
Void Ratio:	1.998	1.071
% Saturation:	91.4	100.0

Remarks:

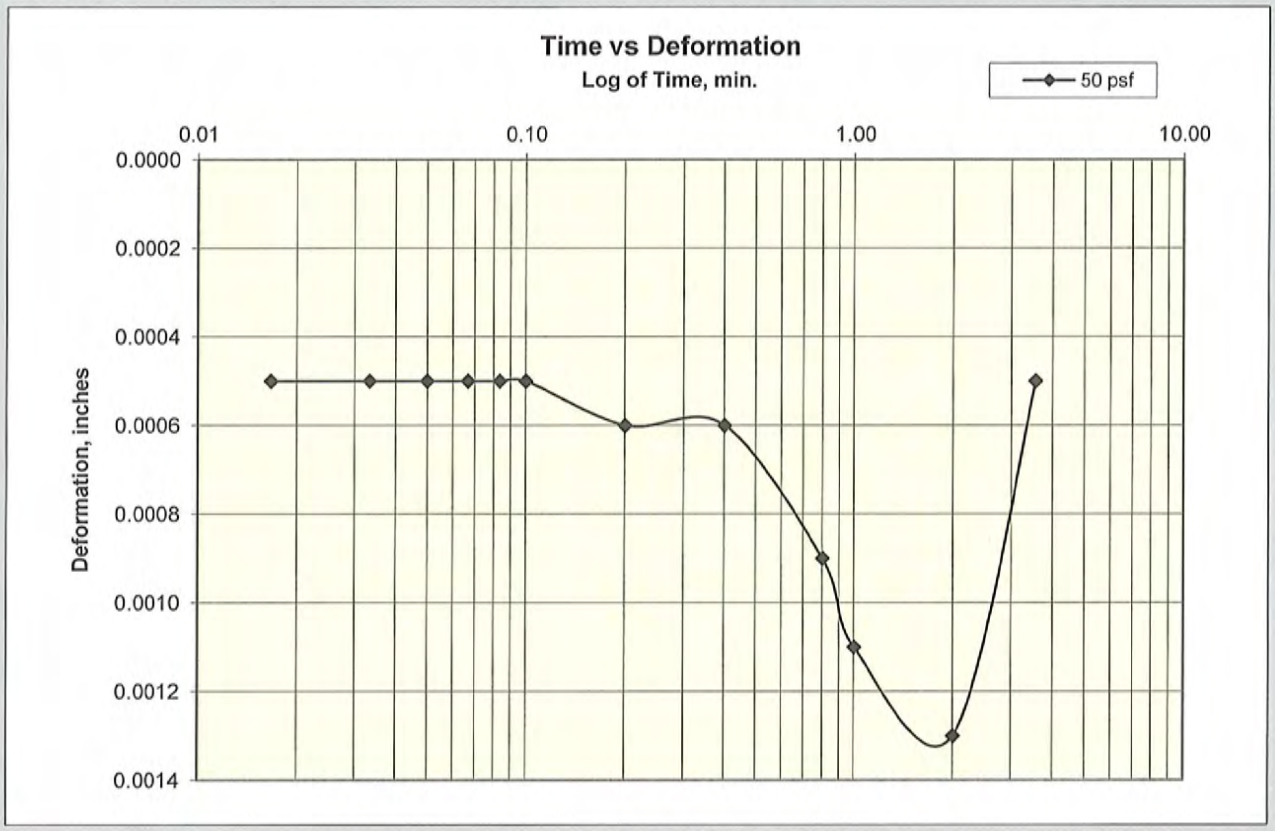
$C_c = 0.647$ $C_c' = 0.216$ $C_v = 0.045 \rightarrow 0.175$

$C_r = 0.052$ $C_r' = 0.0174$

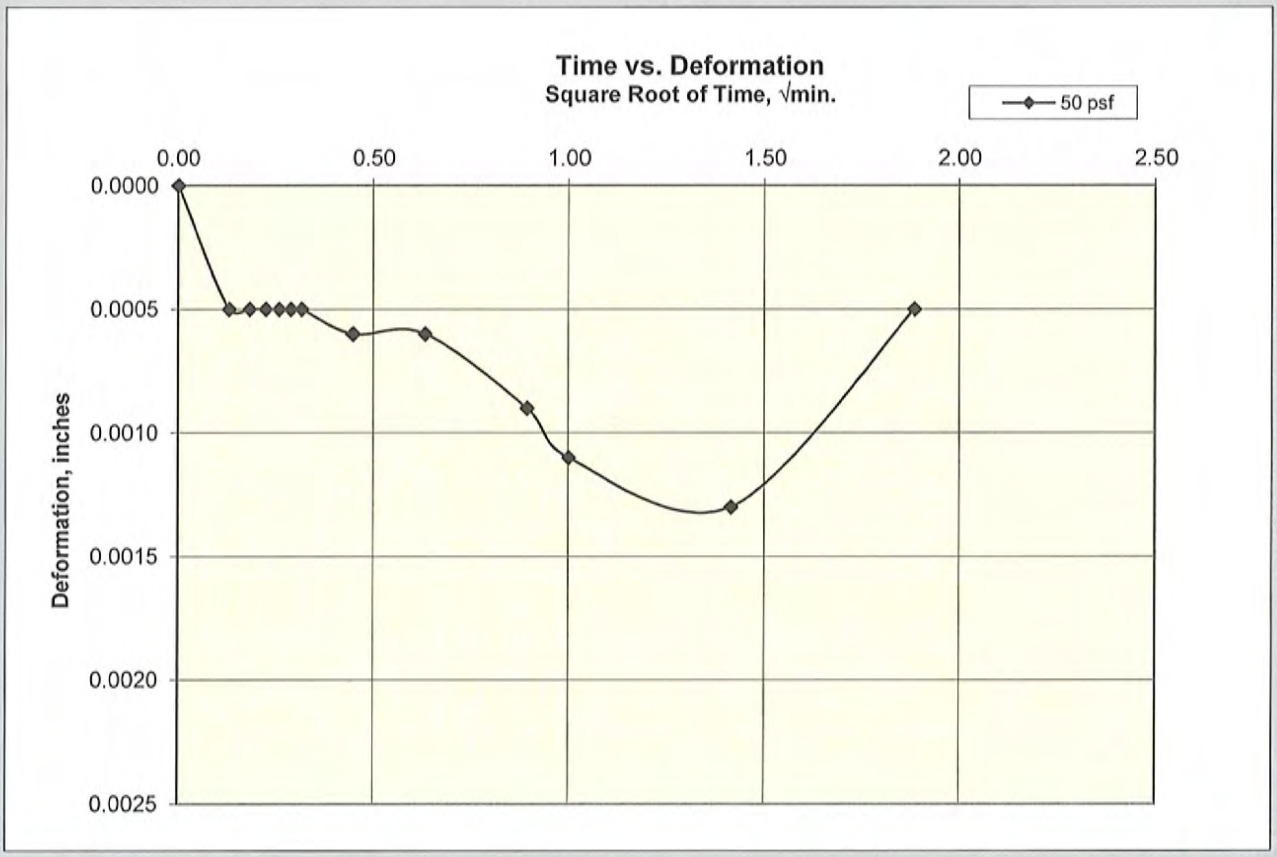
$OCR = \frac{630}{230} = 2.7$ lightly over consolidated

Cooper Testing Labs, Inc.

Load 1 | 50 psf

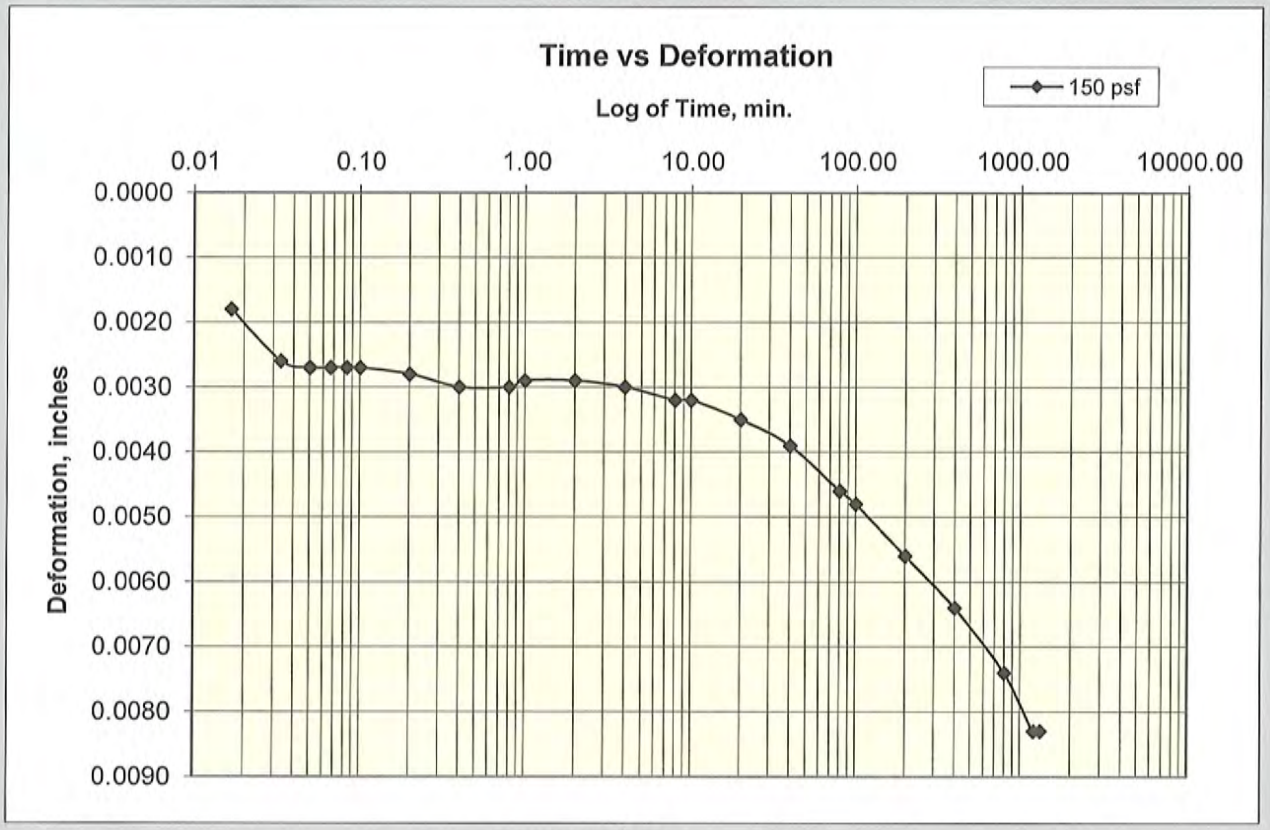


50 psf

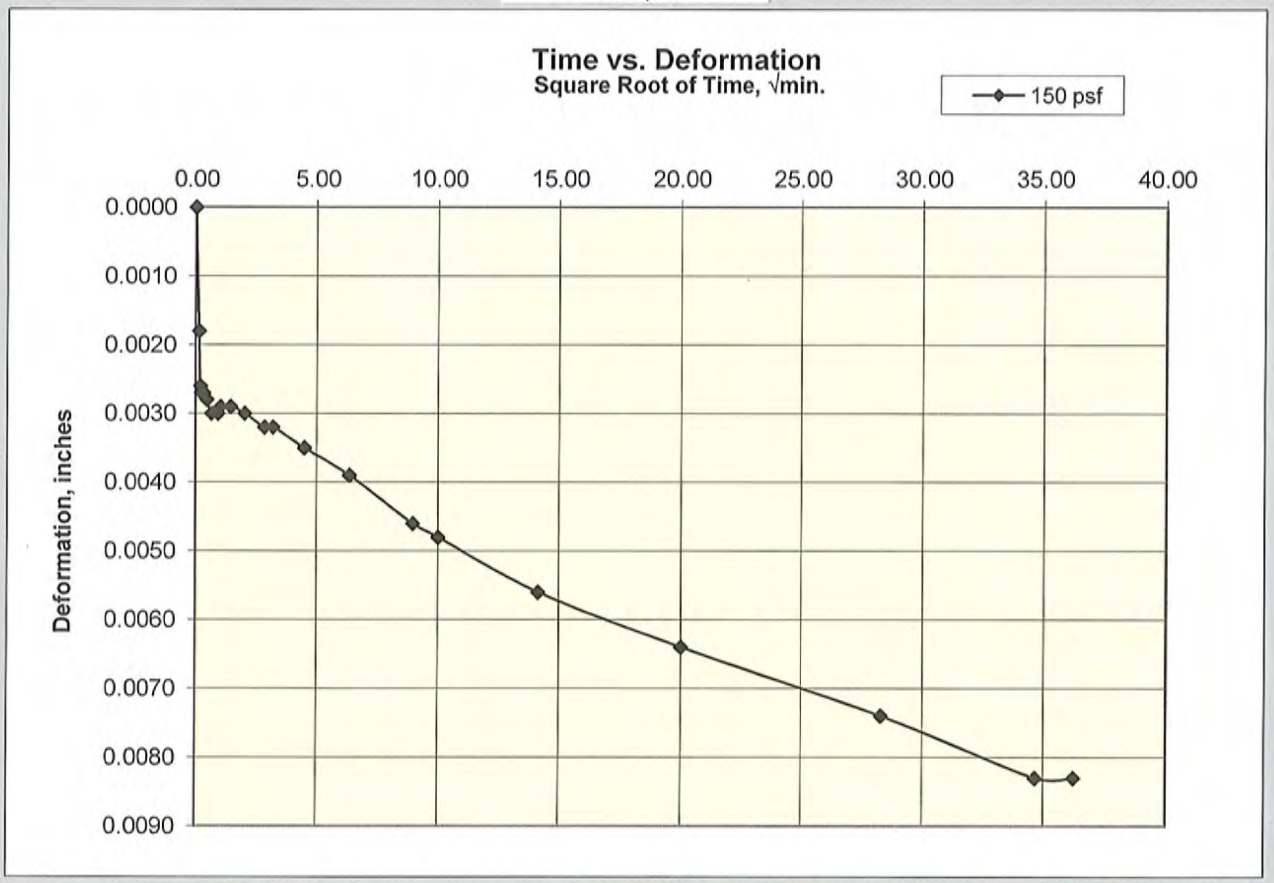


Cooper Testing Labs, Inc.

Load 2 | 150 psf

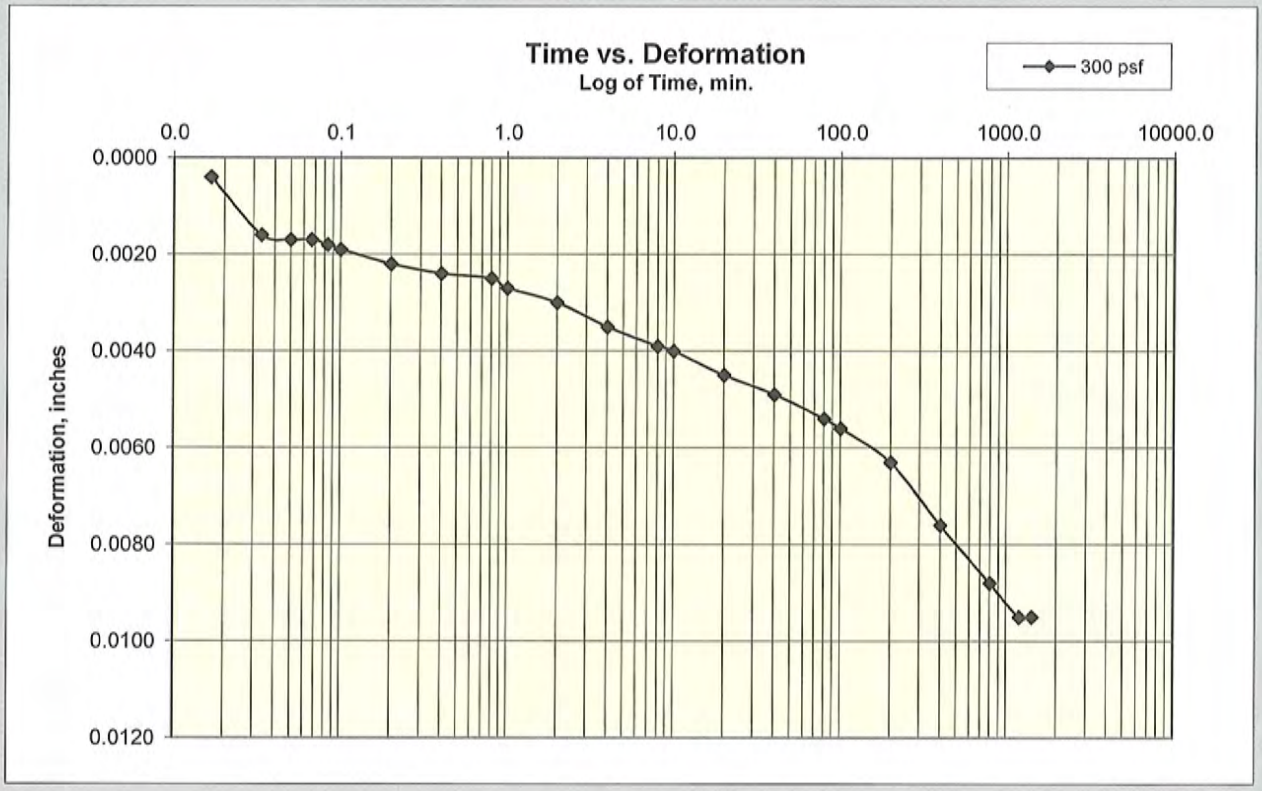


150 psf

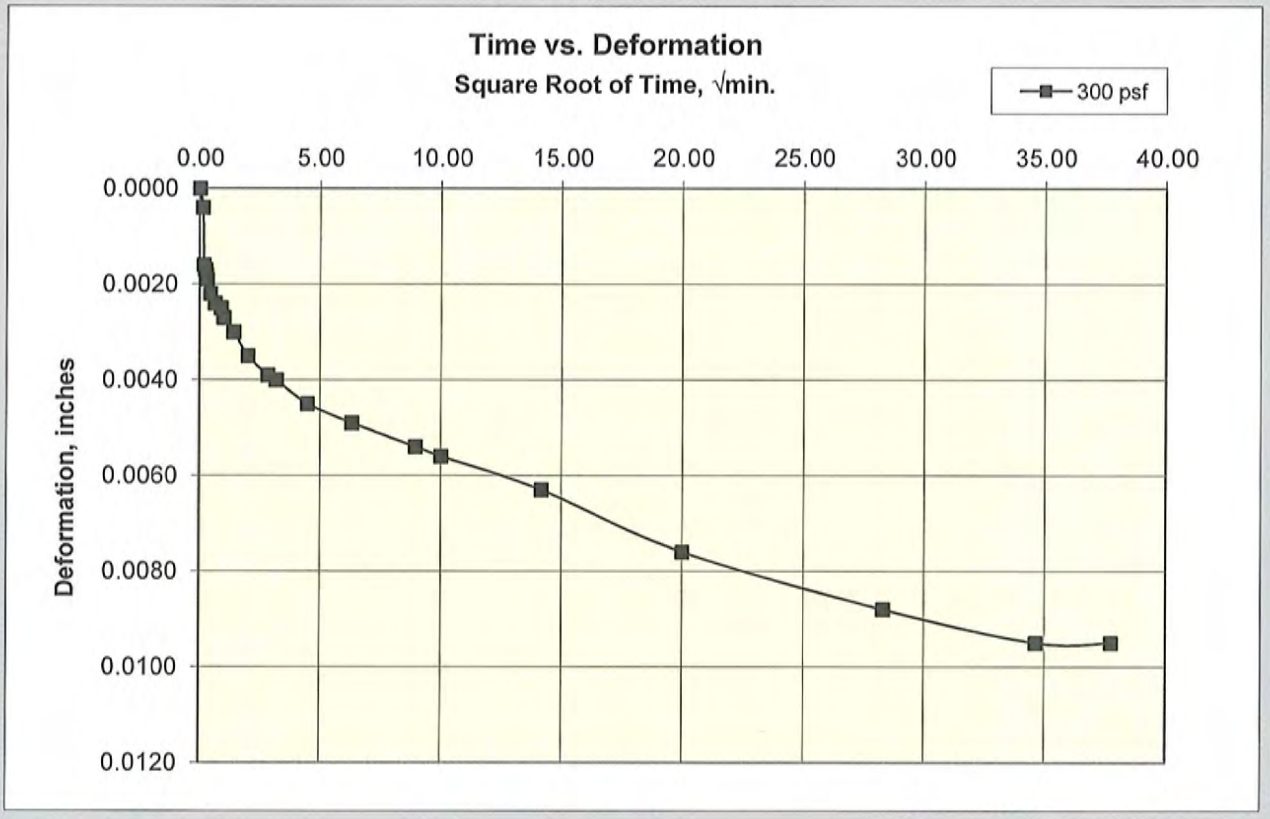


Load 3

300 psf



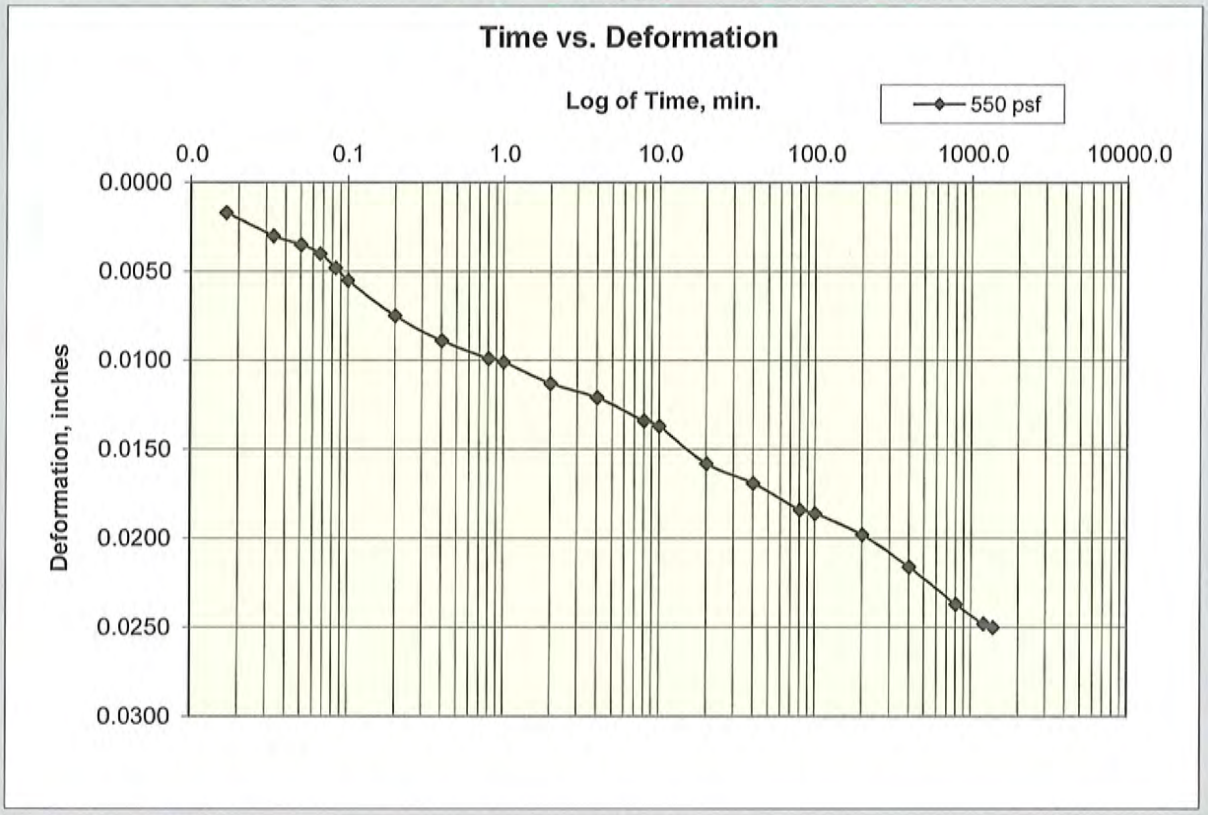
300 psf



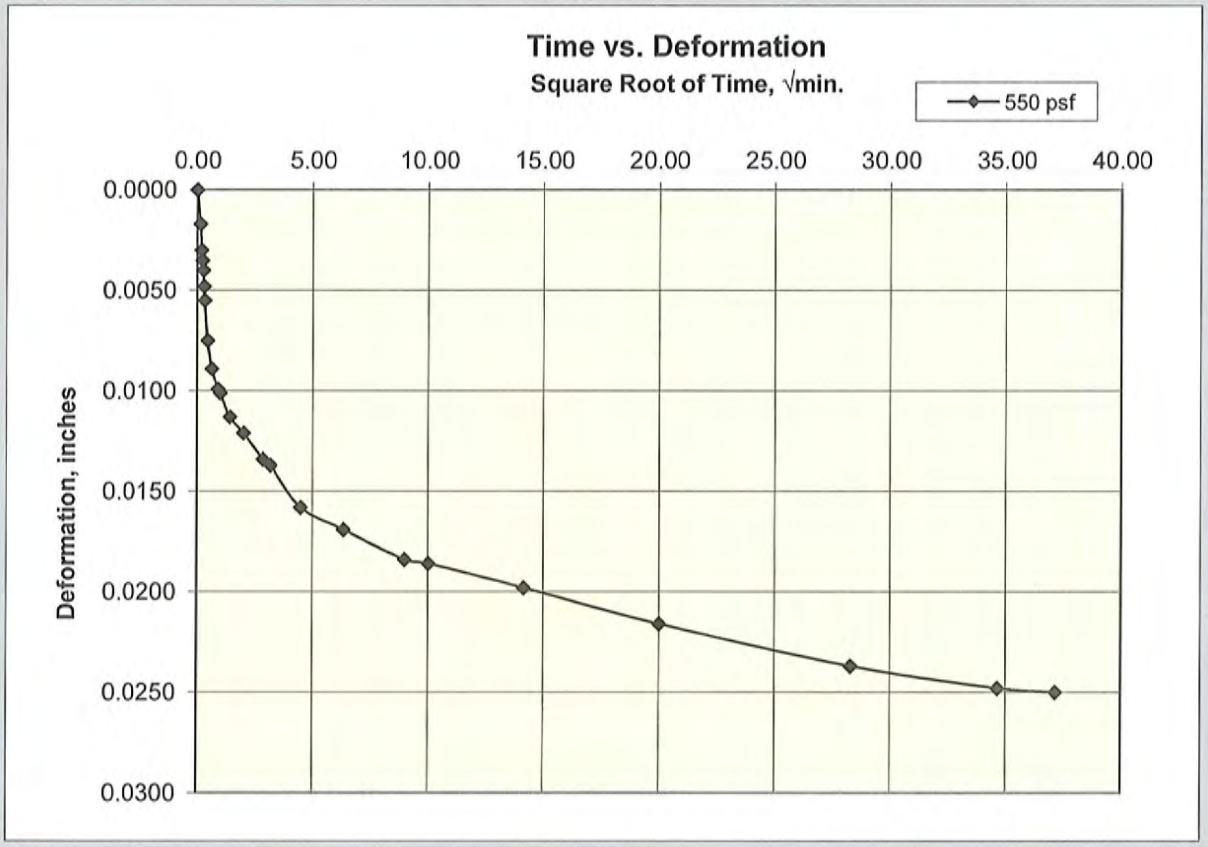
Cooper Testing Labs, Inc.

Load 4

550 psf

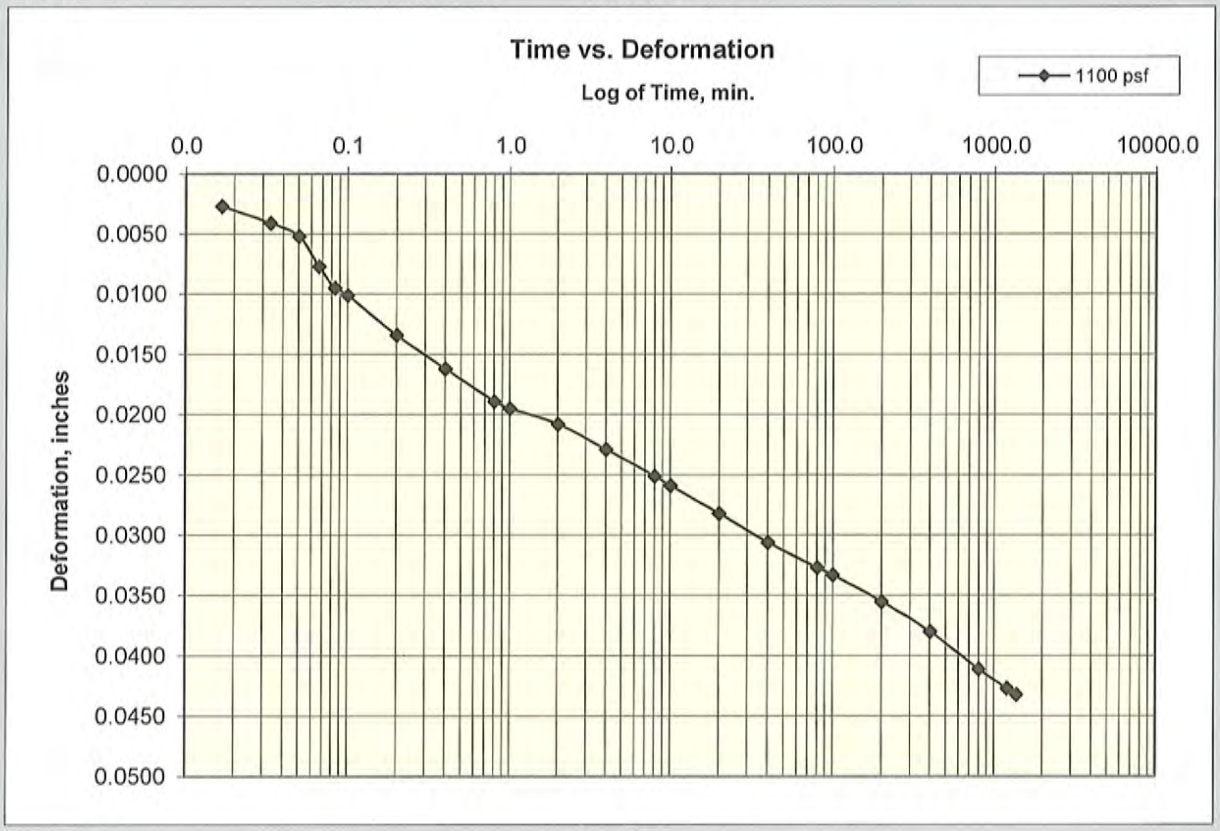


550 psf

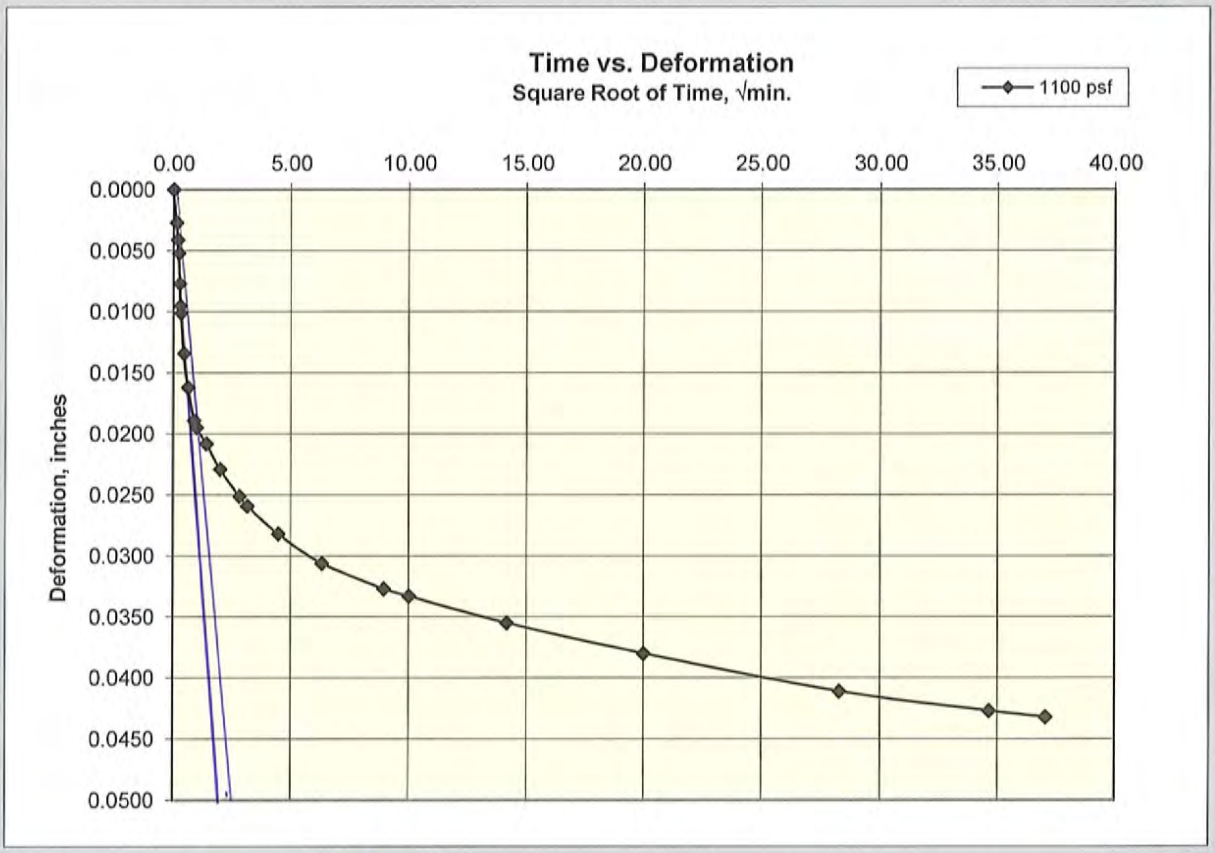


Cooper Testing Labs, Inc.

Load 5 | 1100 psf



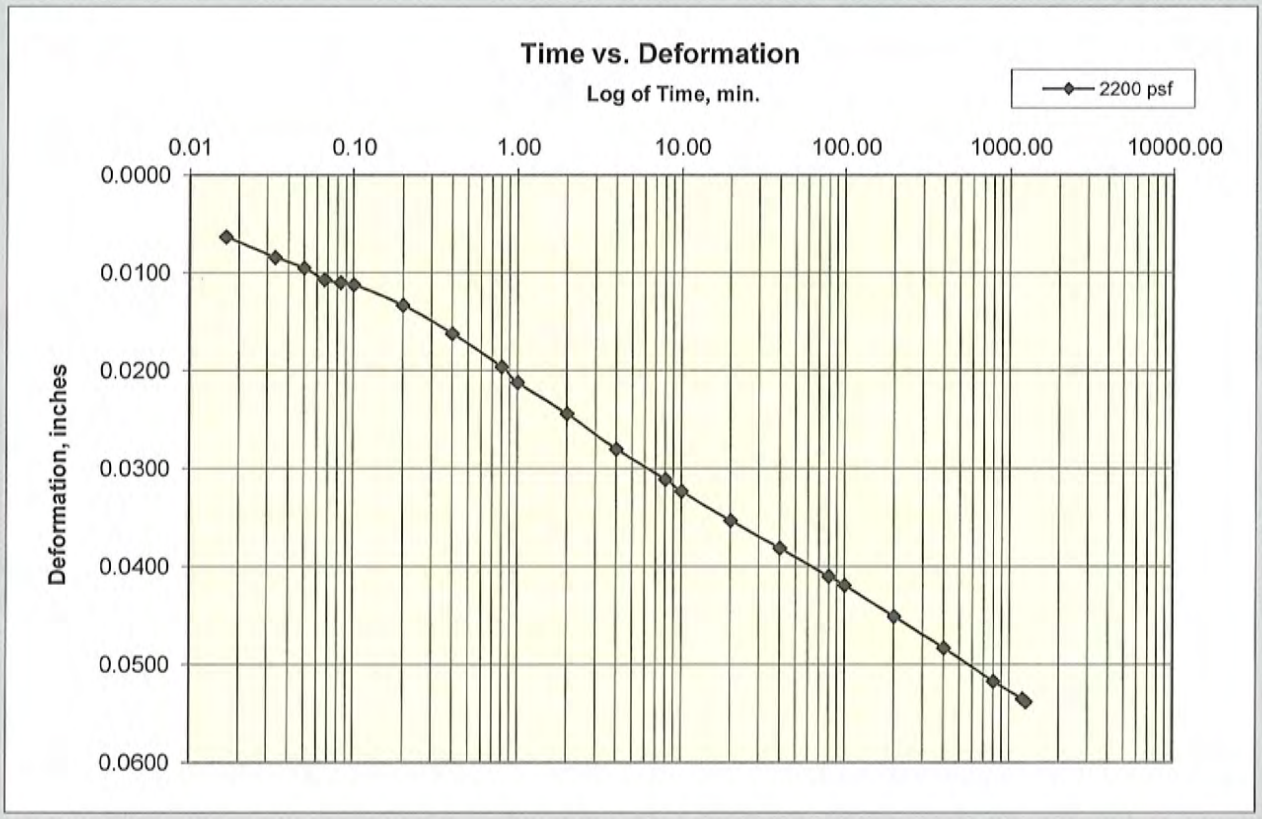
1100 psf



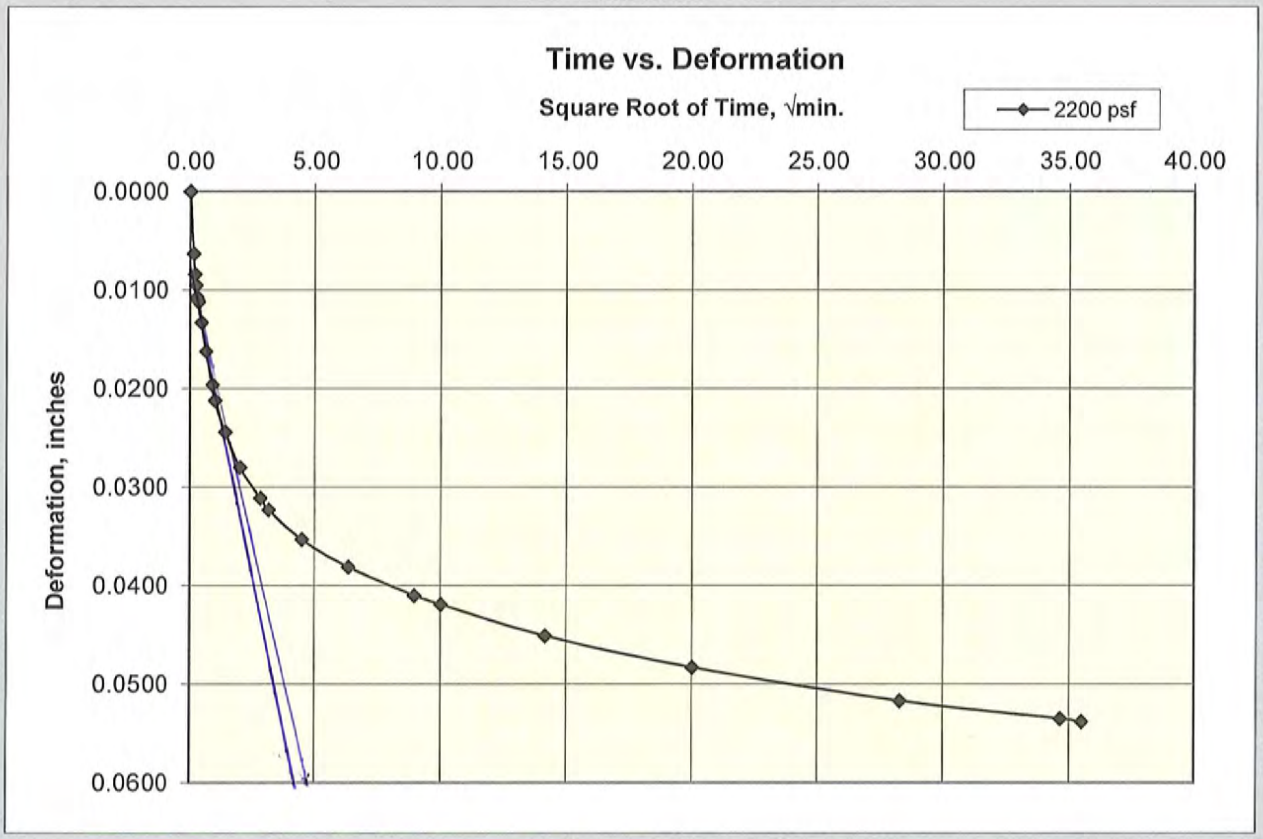
$\sqrt{t_{90}} = 1 = 1$ min

Cooper Testing Labs, Inc.

Load 6 | 2200 psf



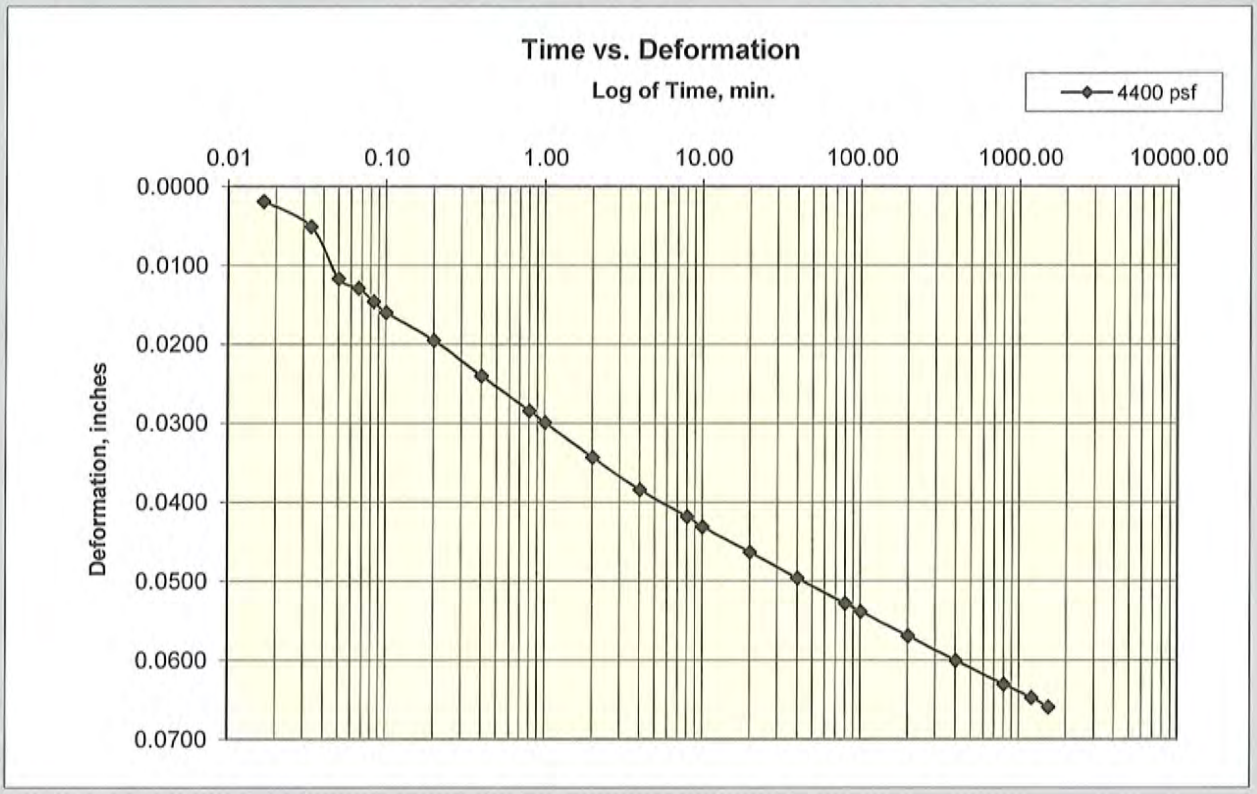
2200 psf



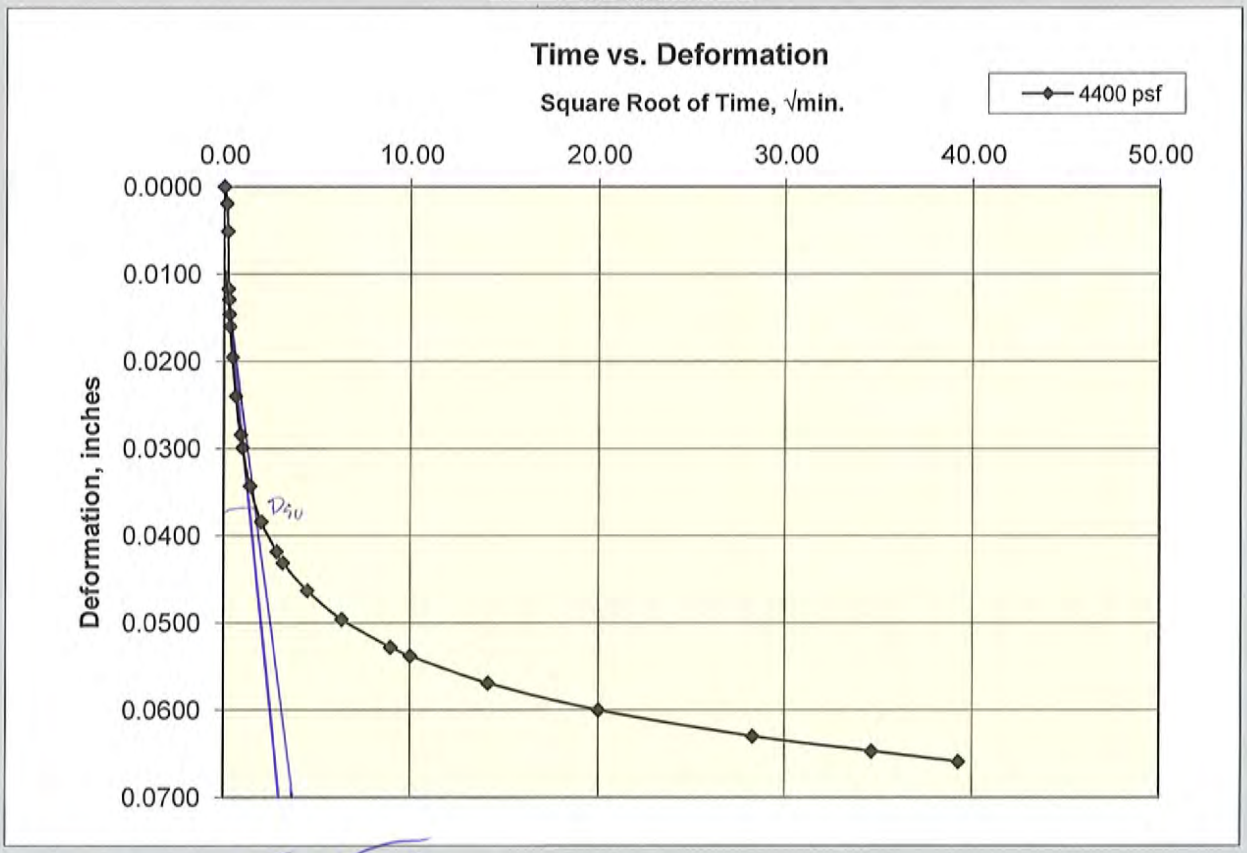
$\sqrt{t_{90}} = \sqrt{1.41} = 2$ min

$t_{90} = 2$ min

Load 7 | 4400 psf



4400 psf

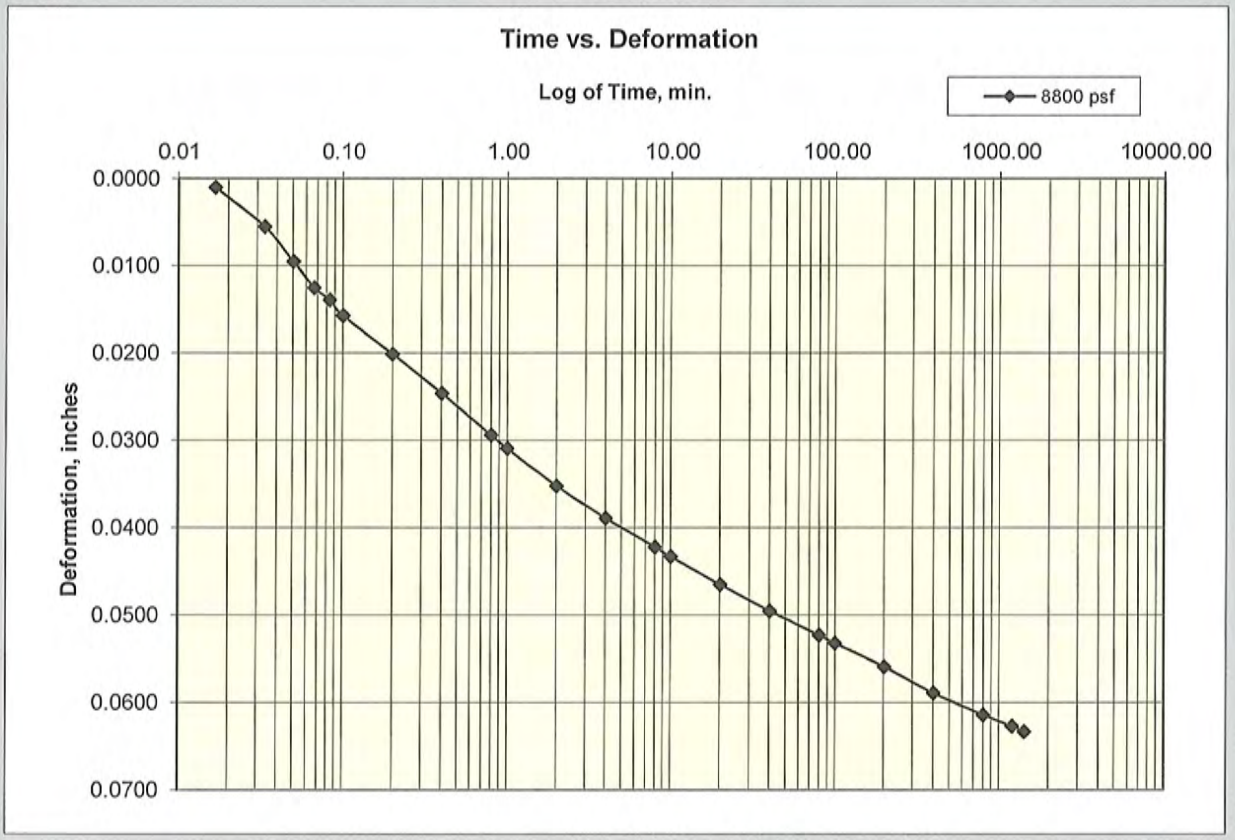


$\sqrt{t_{90}} = \sqrt{1.705}$

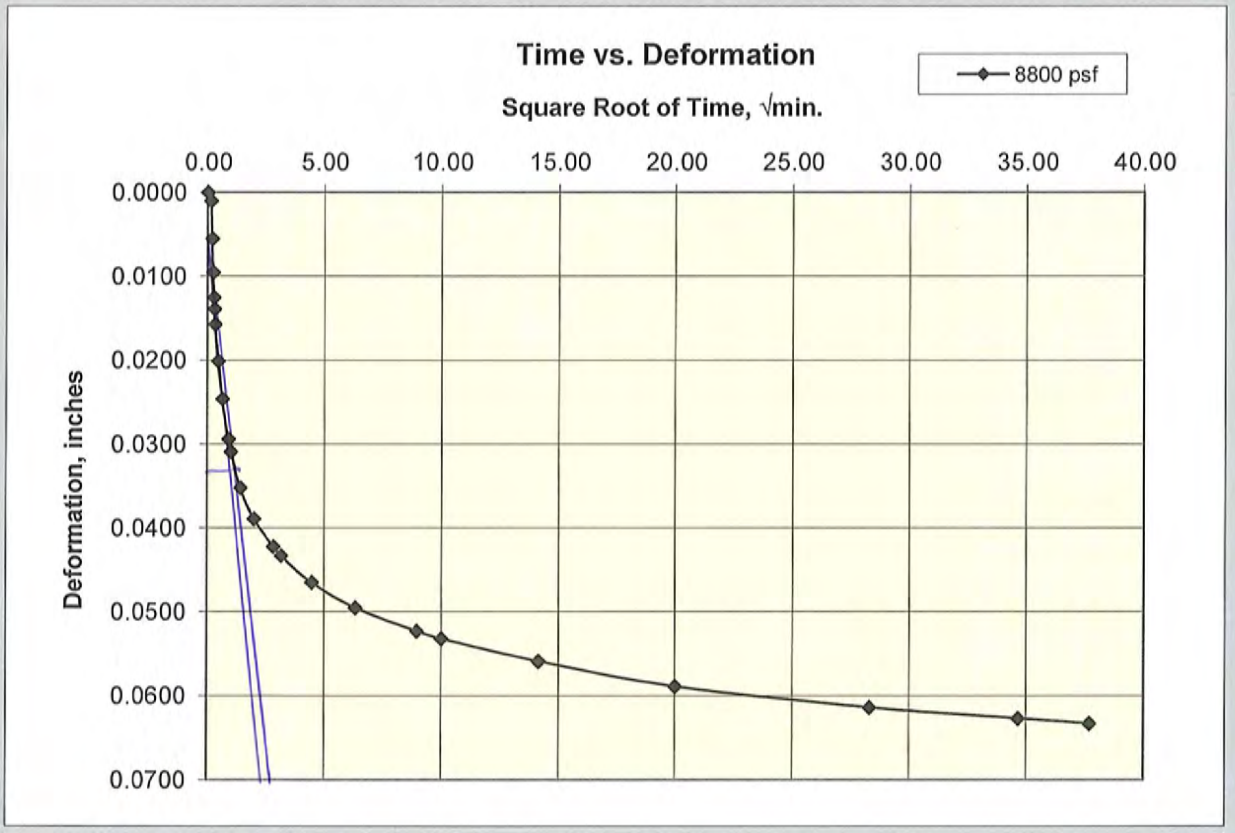
$t_{90} = 2.9$ min

Cooper Testing Labs, Inc.

Load 8 | 8800 psf



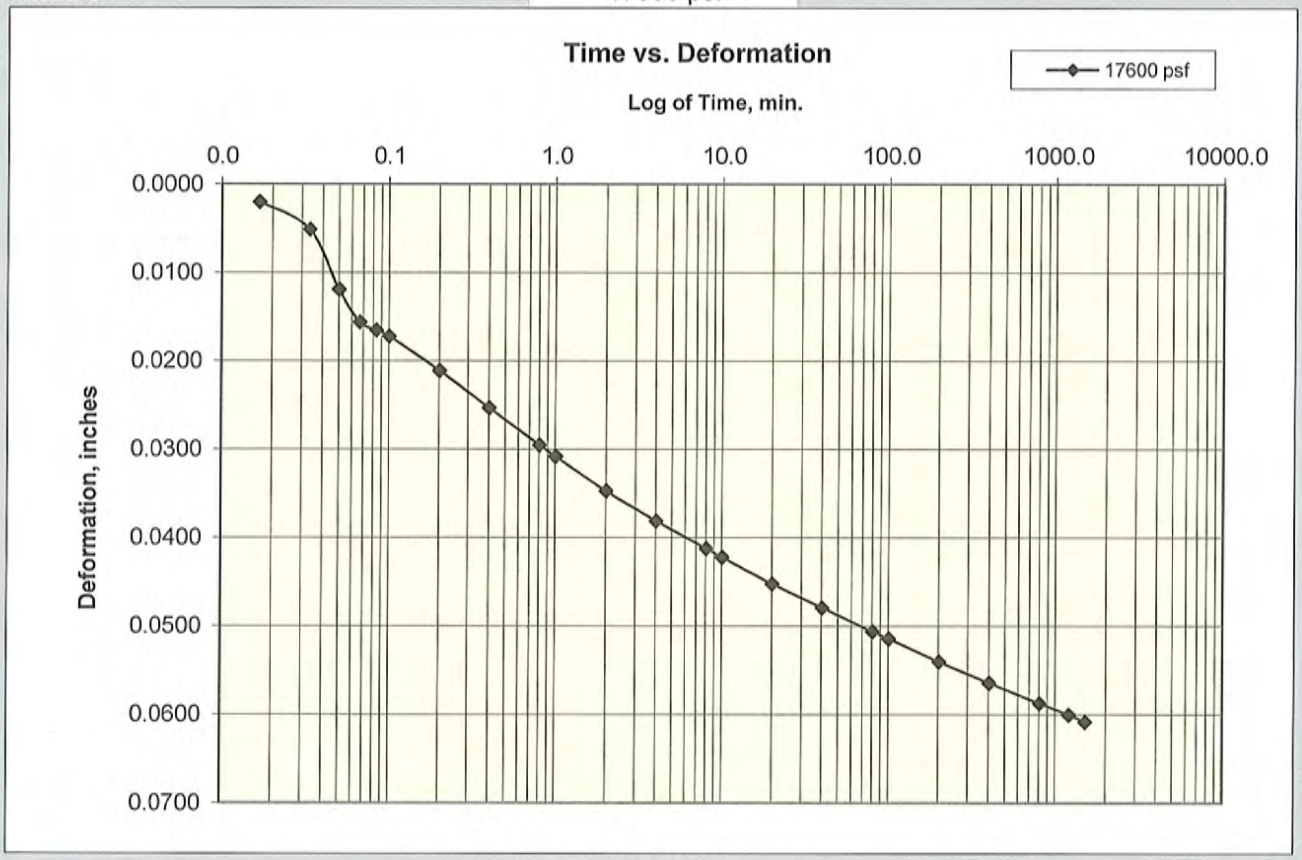
8800 psf



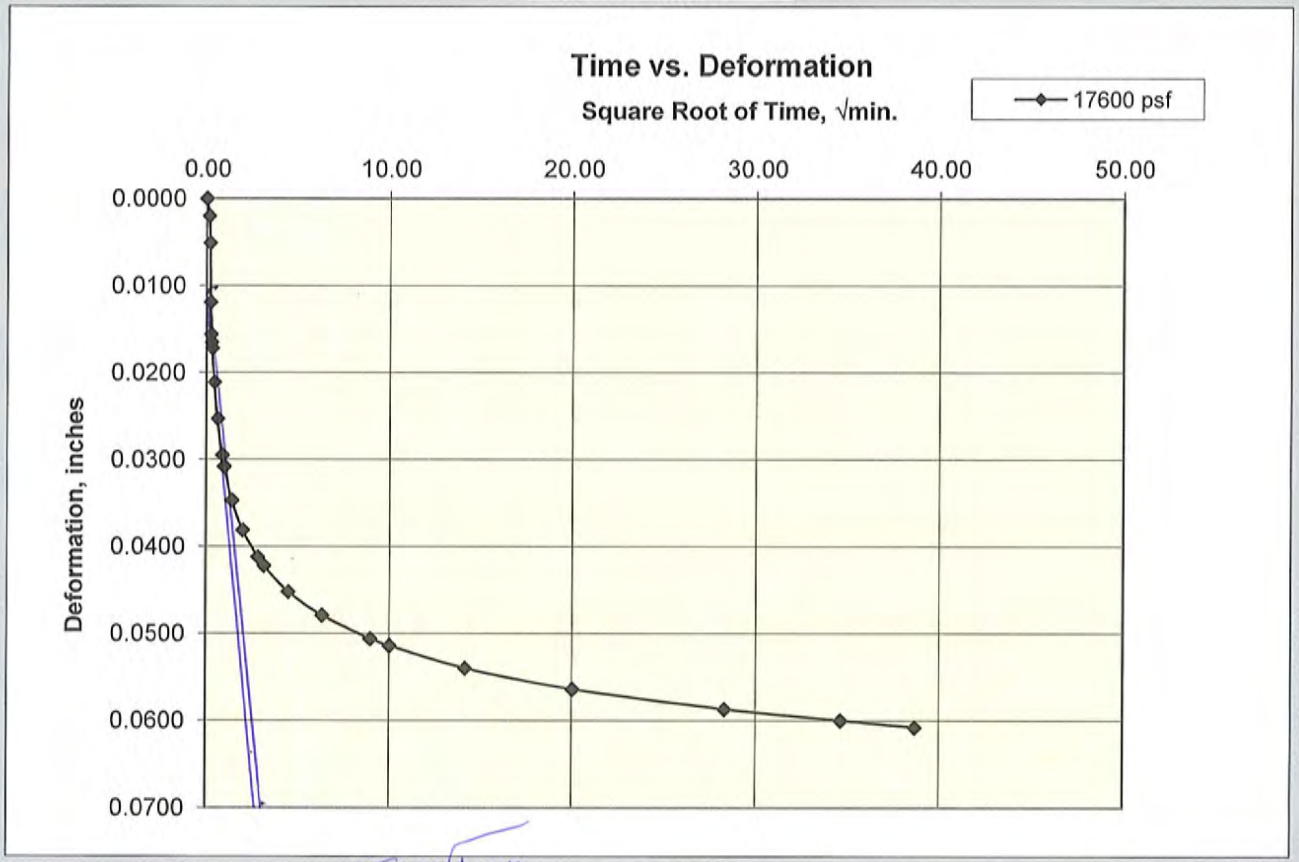
$\sqrt{t_{90}} = \sqrt{1.2}$

$t_{90} = 1.45$ min

Load 9 | 17600 psf



17600 psf



$\sqrt{t_{90}} = \sqrt{1\ min}$

$t_{90} = 1\ min$

APPENDIX G

Rock Slope Protection Analysis

CE&G
CAL ENGINEERING & GEOLOGY

DOCUMENT REVIEW COVER SHEET

1. PROJECT NAME	2. PROJECT NUMBER
Almaden Lake Improvement Project	140540

3. DOCUMENT TITLE
Appendix G Rock Slope Protection Analysis

4. DOCUMENT STATUS DESIGNATION
☐ Preliminary ☒ Final ☐ Cancelled

5. NOTES/COMMENTS
The purpose of this calculation is to determine the thickness of rock slope protection needed for impinging flow and parallel flow according to the California Bank and Shore Rock Slope Design Manual produced by Caltrans

ATTACHMENTS	TOTAL NO. OF PAGES
Rock Slope Protection Design	2

RECORD OF REVISIONS

6. NO.	7. REASON FOR REVISION	8. TOT. PGS	10. ORIGINATOR (PRINT/SIGN/DATE)	11. CHECKER (PRINT/SIGN/DATE)	12. QA/QC (PRINT/SIGN/DATE)	13. APPRVD./ACCPTD (PRINT/SIGN)	14. DATE (M/D/YY)
1	Final Issue	2	Eli Zane	Dan Peluso	Dan Peluso	Dan Peluso	4/30/15

Rock Slope Protection Design

$$W = \frac{0.00002 \cdot V^6 \cdot SG}{(SG - 1)^3 \cdot \sin(r - a)^3}$$

Equation 1 from FHWA-CA-TL-95-10

W = theoretical minimum rock mass (size or weight) which resists forces of flowing water and remains on slope of stream or river bank, POUNDS

V = velocity to which bank is exposed (ft/s)
for PARALLEL flow multiply average channel velocity by 0.67
for IMPINGING flow multiply average channel velocity by 1.33

SG = specific gravity of rock

r = 70 degrees

a = outside slope face angle with horizontal, (Degrrees)

Input Parameters

$V_I := 8 \ \frac{ft}{s}$

$SG := 2.65$

$r := 70 \cdot \frac{\pi}{180}$

$a := 26.6 \cdot \frac{\pi}{180}$

Determine Minimum Stone Weight for Impinging Flow

$$W_I := \frac{0.00002 \cdot (1.33 V_I)^6 \cdot SG}{(SG - 1)^3 \cdot \sin(r - a)^3}$$

$W_I = 52.78$

Determine Minimum Stone Weight for Parallel Flow

$$W_P := \frac{0.00002 \cdot (0.67 V_I)^6 \cdot SG}{(SG - 1)^3 \cdot \sin(r - a)^3}$$

$W_P = 0.86$

Determine RSP Class of Outside Layer (Impinging Flow)

From Table 5-1 using W = 53 lbs and gradation 50-100
Use Caltrans Facing Class or Backing No.1

Determine RSP Class of Outside Layer (Parallel Flow)

From Table 5-1 using W = 0.86 lbs and gradation 90-100
Use Caltrans Backing No. 3

Determine the Required Layers of RSP (Impinging Flow)

For Caltrans Facing class in Table 5-2
*Inner layer = None
*Backing Class = None
*RSP-Fabric Type A

Determine the Required Layers of RSP (Parallel Flow)

For Caltrans Facing class in Table 5-2
*Inner layer = None
*Backing Class = None
*RSP-Fabric Type A

Determine the Minimum Thickness of RSP (Impinging Flow)

From Table 5-3 the minimum thicknesses are
*Facing Class = 1.8 feet
*Inner layer = 0 feet
*Backing Class = 0 feet
*RSP-Fabric Type A
Total RSP Thickness = 1.8 feet

Determine the Minimum Thickness of RSP (Parallel Flow)

From Table 5-3 the minimum thicknesses are
*Backing No. 3 = 0.75 feet
*Inner layer = 0 feet
*Backing Class = 0 feet
*RSP-Fabric Type A
Total RSP Thickness = 0.75 feet

Appendix E
Methyl Mercury Report



TECHNICAL MEMO

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December, 2016

Subject: Almaden Lake environmental conditions relative to mercury

Introduction

The purpose of this technical memorandum is to describe the available knowledge relative to mercury issues at Almaden Lake. This description provides a basis for the analysis to be presented in the Environmental Impact Report for the Almaden Lake Project being undertaken by the Santa Clara Valley Water District (District).

A primary objective of the Project is to improve mercury conditions. Thus, although an environmental evaluation is typically focused on the potential negative impacts that a project could impart, this memo often describes conditions which are already impacting the environment and which the Project will improve. Furthermore, although the focus here is on mercury, other conditions that influence mercury cycling in the environment and which may be changed by the Project are also discussed.

This memo is organized around two broad conditions: physical and legal. The remainder of this section provides background information relevant to those conditions. To facilitate public review of this technical memo, **Appendix A** includes definitions and acronyms used in this document.

Mercury Contamination is Widespread

In the U.S., mercury pollution has contaminated 18 million acres of lakes, estuaries, and wetlands, and 1.4 million river miles (NRDC 2014). In California, 74 of the 350 reservoirs recently sampled are now identified as mercury-impaired. The actual number of mercury-impaired reservoirs is likely substantially higher—reservoirs will be added as more data are collected (SWRCB 2013).

The primary environmental concern with mercury is exposure to methyl mercury (MeHg). Exposure to MeHg comes predominately from eating fish and shellfish that have accumulated it through their food web. Microscopic algae can concentrate dissolved MeHg in the water column to levels approximately 100,000-fold greater, making this a critical step in the biomagnification process (Watras et al. 1994). The primary route of MeHg exposure in humans and wildlife is fish consumption. In turn, human consumption of contaminated fish and wildlife poses significant health risks (USEPA 2009). MeHg is linked

to developmental problems in fetuses and children and to nervous system effects in adults (USEPA 2001). Similar developmental and nervous system effects have been observed in wildlife globally (Weiner et al. 2003) and in Bay Area birds (Ackerman et al. 2008).

Mercury Cycling is Complex

During summer, lakes tend to stratify, with warmer surface water essentially floating on colder, denser water below. The zones or water layers are referred to as the epilimnion (surface layer mixed by wind and daily temperature cycles), metalimnion (transitional, with the most rapid change in density), and hypolimnion (profundal, isolated, dark zone).

During periods of stratification, anoxia in the hypolimnion is primarily caused by microbial degradation of organic matter, or by utilization of nutrients in the water column. Typically after many years of operation of a reservoir or lake, there is a build-up of organic matter at the bottom (sometimes termed sediment oxygen demand) that would continue to cause anoxia even if all inputs of new organic matter and nutrients were eliminated. After dissolved oxygen is utilized, anaerobic digestion of organic matter produces ammonia, which is an important nutrient for the production of algae. This is why late summer algae blooms are common in temperate-climate lakes. In some waterbodies, the seasonal production of algae becomes the dominant source of organic matter that settles to the bottom, adding to the build-up of organic matter (Horne and Goldman 1994).

Mercury becomes methylated in aquatic environments as a by-product of bacterial iron and sulfate reduction (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008a). Despite much literature on the topic, the production and transformation mechanisms of MeHg in aquatic environment remain poorly quantifiable (USEPA, 2006; Ullrich et al., 2001). Knowledge is also lacking about the many chemicals (sulfides and dissolved organic carbon) and biological processes (bacterial activity) that control mercury methylation and bioaccumulation in aquatic environment, particularly at the sediment-water-interface (de Wit et al., 2012; Ullrich et al. 2001).

The mercury cycle includes a complex set of biogeochemical processes, of which methylation is ecotoxicologically important. Waters with low dissolved oxygen concentrations promote the activity of sulfate-reducing bacteria and therefore sulfide production. Sulfide production enhances the solubility of particulate mercury both in the sediments and suspended in the water column. The sulfate-reducing bacteria take up the solubilized mercury and form MeHg, as shown in **Figure 1** below (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008a).

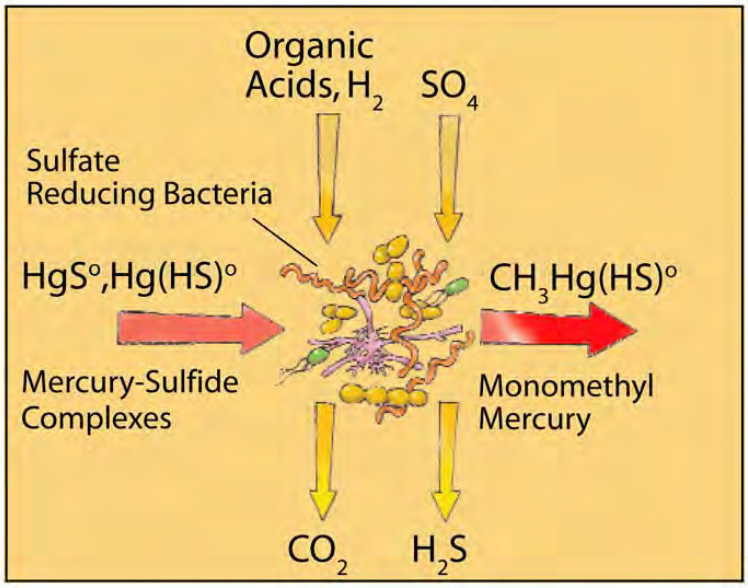


Figure 1. Mercury Methylation by Sulfate-Reducing Bacteria (Source: Tetra Tech. 2005)

MeHg is readily bioaccumulated and transferred in food webs, and can biomagnify to high concentrations in predatory fish and wildlife. Biotic exposure to MeHg in the ecosystem is strongly influenced by the net balance between processes that yield MeHg and make it available to aquatic biota versus processes that degrade MeHg or decrease its bioavailability for uptake.

Rates of mercury methylation in water, sediments, and aquatic organisms depend upon numerous environmental factors, including type and abundance of microorganisms and organic matter, pH, temperature, redox potential, sulfate concentration, and mercury concentration (D'Itri 1990). Concentrations in fish are influenced by their size, diet, sex, and trophic position as well as water chemistry and mercury methylation rates (Weiner et al. 2003). Many studies in the literature have attempted to find correlations between fish concentration and physical and chemical characteristics and a number of parameters have been found to be of primary importance in different locations. For example, the most important factors found to control fish mercury levels among 20 reservoirs in the state of Maryland were water MeHg and sulfate concentration and lake morphology (Mason and Sveinsdóttir 2003). Water quality regulators in California are currently working to develop such linkages between fish mercury concentrations and their environmental conditions[1].

Mercury Cycling in Lakes

Reservoir creation has been known for years to lead to elevated MeHg in fish (Rosenberg et al. 1997). Kuwabara and colleagues (2005) measured exceedingly high bioaccumulation rates of MeHg in the phytoplankton and zooplankton of Almaden Lake over a decade ago. Stewart et al. (2008) suggest that the difference in MeHg bioaccumulation among food

[1] For more information: www.waterboards.ca.gov/water_issues/programs/mercury/.

webs in a reservoir in the legacy gold mining region of the Sierra Nevada is influenced by the characteristics of a given food web.

Because of the higher rates of methylation in lakes, and the efficiency with which biota take up MeHg, wastes that have been transported to lakes are of particular significance with respect to mercury bioaccumulation. Several investigators have shown that the introduction of MeHg produced in the hypolimnion during stratification and its uptake by phytoplankton represents an important internal source of MeHg in lakes or reservoirs, and also a significant entry point of mercury into the food web (Herrin et al. 1998; Gorski et al. 1999; Sellers et al. 2001; Slotton et al. 1995). In addition to biological uptake, MeHg can be lost from the water column as it adsorbs to settling particles or degrades in sunlight ("photodemethylates").

Lake Mercury Management Options

Based on current understanding of MeHg cycling, lake managers can generally consider three types of activities to address their mercury impairment, as discussed by Davis and colleagues (2012): watershed mercury source controls (reduce inputs), reservoir (or in this case lake) operations (reduce methylation and bioaccumulation), and fisheries management (reduce biomagnification). Maintaining oxic conditions in the hypolimnion is a promising in-lake operational strategy in general for improving water quality (Beutel and Horne 1999) and is promising for addressing mercury impairment (Beutel et al. 2014).

Project Objectives and Alternatives

The proposed Project will address issues related to mercury and anadromous fish (i.e., those fish that migrate upstream from saltwater to freshwater to spawn, such as steelhead and salmon, also known as migratory fish). Major Project objectives are as follows:

- Separate Alamitos Creek from Almaden Lake using a proposed levee;
- Re-contour the remaining lake bottom and cap it with clean fill;
- Expand the Park area into a small portion of the existing lake at the beach area;
- Stabilize the existing island and construct a new additional island;
- Establish vegetation along the banks of the restored Alamitos Creek channel, new lake edge and the islands;
- Provide water to the lake from either the creek or recycled water [as described below]; and
- Add a pipeline connection between the lake and the Alamitos Percolation Pond, which is a groundwater recharge pond operated by the District.

The preferred Project is expected to include the following elements:

- Isolating Alamitos Creek in an approximately 210-foot wide channel separated from the remaining lake to its east with a new levee. The new levee would be approximately 40-feet wide with dual use as a maintenance road and trail.
- Re-contouring the bottom of the lake to a more level surface and capping the existing mercury laden sediment with at least two and a half feet of clean fill. The lake would be approximately 28 feet deep (compared to 30 feet currently) and approximately 16 acres in area (compared to 32 acres currently). Thus, the ratio of depth to area will approximately double.
- Expanding the open park area to the west of the lake by approximately two acres into the existing lake and beach area.
- Expanding and reshaping the existing island and stabilizing its banks, and establishing a second island up to 0.75 acres in area.
- Installing riparian vegetation along both banks of the new channel and islands.
- Installing a pipeline connection from the remaining lake to the Alamitos Percolation Pond.

Two possible water sources could fill Almaden Lake in the future:

- Water from Alamitos Creek would flow into Almaden Lake through a diversion structure through the levee at the upstream end of the lake. The diversion structure would be screened to prevent native fish in the creek from entering the lake. During the dry season, water diversion from the creek into the lake may require the 5 feet of head created when the Alamitos Flashboard Dam is installed (in summer months) near the Coleman Avenue Bridge. Water from Alamitos Creek would flow into the lake at rate of 0-5 cfs, depending on the outlet structure geometry and the difference in water surface elevations.
- Under the recycled water option, 200 feet of gravity pipe would deliver water from the future San Jose Water Company Recycled Water Pipeline to the lake. The lake would be operated as a closed-loop system such that water in the lake would not comingle with water in the creek.

The following activities would be part of the overall lake management program:

- The four SolarBee devices (10000 or 7500 series) already in the lake would be re-installed in deeper areas to pump water from the bottom of the lake to the surface, which will help to mix the entire water column. Three additional SolarBee devices (smaller 5000 series) would be installed in shallower areas to mix just the surface water where undesirable algae can proliferate.
- Algaecide or dye may also be added to the lake to control eutrophication in the lake.
- Sediment within the channel will be excavated if/when the accumulated depth exceeds two feet.

Physical Setting

Almaden Lake, which is managed by the District, was developed from a former gravel quarry in Alamitos Creek that began in the 1940s and expanded outward. Almaden Lake Park was opened in 1982 (City of San Jose 2004). Currently, the lake is approximately 40

acres in area, with a maximum depth of 13 meters (43 feet), and is used for boating, swimming, and fishing. Off-stream percolation ponds were constructed downstream of the Project area, downstream of the confluence of Alamitos and Guadalupe Creeks, in 1976. The Alamitos Drop Structure was built to impound water to fill the percolation ponds. A fish ladder at the Alamitos Drop Structure was added in 1999.

In broad terms, inorganic particulate mercury from sources upstream in the Guadalupe River Watershed is transported by storm flows in the wet season while mercury methylation by naturally occurring bacteria occurs predominately in the dry season (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008a). This section describes the current physical conditions of the Project area insofar as they relate to mercury and other water quality conditions.

Geology

The Guadalupe River Watershed can be divided into three geologic regions: 1) an upland region with bedrock outcrops, 2) an alluvial plain, and 3) a baylands region. Sedimentary and metamorphic rocks underlie most of the upland region, chiefly belonging to the Franciscan Formation. The formation includes common sedimentary rock types laid down on ancient seafloors, such as sandstone, shale, greywacke, limestone, and conglomerates, and common metamorphic and volcanic rocks, such as chert, serpentinite, greenstone, basalt, and schist. The river's alluvial plain—the area where it has long flowed, flooded, and deposited sediments—overlies a deep structural basin filled with up to 1,500 feet of Plio-Pleistocene and Quaternary unconsolidated alluvial materials. The alluvial deposits consist of well-graded, interbedded fine sands and silts with some gravels (Tetra Tech, 2005). Almaden Lake lies in the upper alluvial plain. The major topographic features and waterbodies are identified in **Figure 2**.

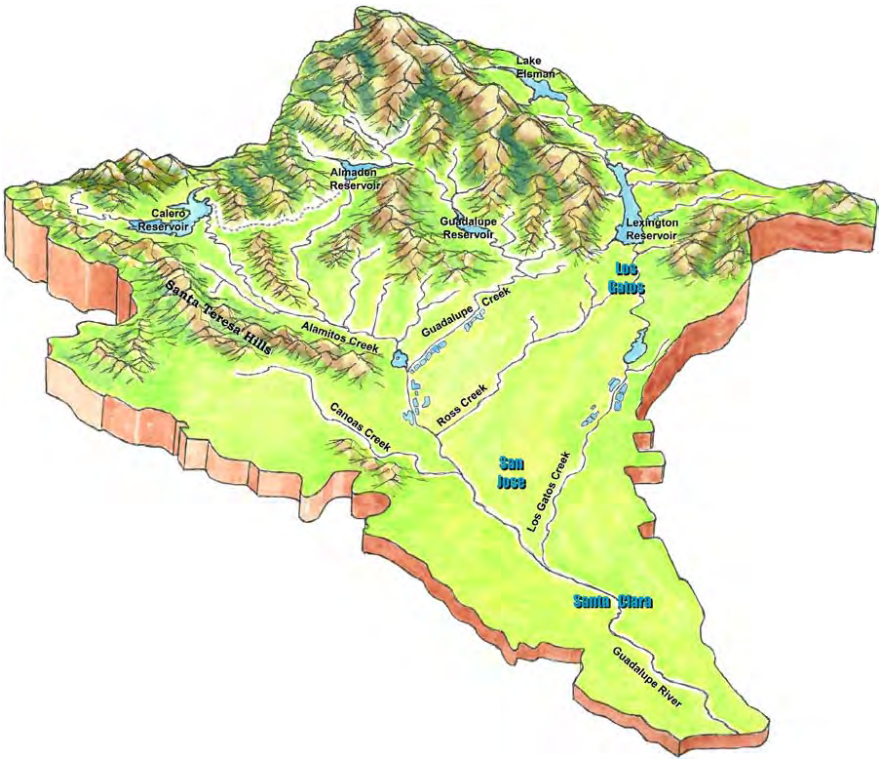


Figure 2. General topography of Guadalupe River Watershed. (Source: Tetra Tech. 2005)

Soils overlying the silica carbonate deposits have elevated total mercury. Five soil sampling areas in the former upland mining area had total mercury concentrations ranging from 3.2 to 570 mg/kg; the median total mercury concentrations were 17 to 200 mg/kg (Dames and Moore 1989). Other rock types that had some cinnabar in a few locations, as noted in the report on the New Almaden Mining District (Bailey and Everhart 1964) include greywacke and shale in the Harry area and altered greenstone or tuff in the nearby upper Cora Blanca and Los Angeles areas of the New Almaden Mining District (Tetra Tech 2005).

Mercury Sources into Almaden Lake

Approximately 38 million kilograms of mercury was produced in the New Almaden Mining District upstream of Almaden Lake; about 70 percent of the production came before 1875, and about 80 percent before 1935. Prior to the mining era, there were no lakes or other large natural impoundments in the Guadalupe River Watershed (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008a). Prior to construction of the Guadalupe and Almaden Reservoirs in 1935, roasted mine wastes, called calcines, and other mine wastes were disposed in or near the creeks so that the materials would be transported downstream by winter flows. Calcines and other mine wastes are still present in and along the banks of Alamitos Creek (Tetra Tech 2005). In addition to the legacy mercury mines and debris in the watershed, additional mercury sources include (roughly in order of greater contributions first): natural mineral springs and native soils, abandoned gold mines and remnant hydraulic

mining debris in the Sierra Nevada[2], urban runoff with mercury-containing waste, and atmospheric deposition.

Gehrke and colleagues (2011) found that the mercury in South San Francisco Bay sediments is primarily a result of mercury released from historical Coast Range mercury mines (primarily the same ones upstream of Almaden Lake), which exhibits a distinct stable isotopic "fingerprint." Because a large quantity of mining waste was present in the creek canyons within the New Almaden Mining District prior to construction of Almaden and Guadalupe reservoirs, the bottom sediments in these reservoirs are likely the same dominant sources of mercury as in the bay downstream. In addition, particulate and dissolved mercury loads continue to be transported to Almaden Lake during each wet season.

New Almaden is of significant concern relative to California's other mercury and gold mines due to its much larger area that was mined historically and MeHg production and bioaccumulation rates currently. On the other hand, conditions at New Almaden are alkaline, hence the acid mine drainage problems associated with other mercury mines in the Coast Range do not occur at New Almaden (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008a).

Flood Control

Modifications to control flooding in the Alamitos Creek Watershed have occurred since about 1866, which affect sediment transport and locations where mercury-laden sediment accumulates (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008a). In the late 1970s, flood control engineers built levees along Alamitos Creek from the Harry Road bridge to the confluence with Almaden Lake. Some of these flood control projects may have decreased the extent of erosion along stream banks by installing bank protection and changing the energy gradient to reduce water velocity in fast-flowing segments. Others may have shifted erosion and associated sediments and mercury to elsewhere in stream corridors.

Flood control measures have included the removal of sediment for routine maintenance from the drop structures and flood control structures from various parts of the Guadalupe River Watershed (see Table 2-1 in Tetra Tech 2005) and bank protection projects to prevent erosion. Sediment removal removes mercury and prevents it from reaching San Francisco Bay.

Inflow and Outflow Mercury Concentrations

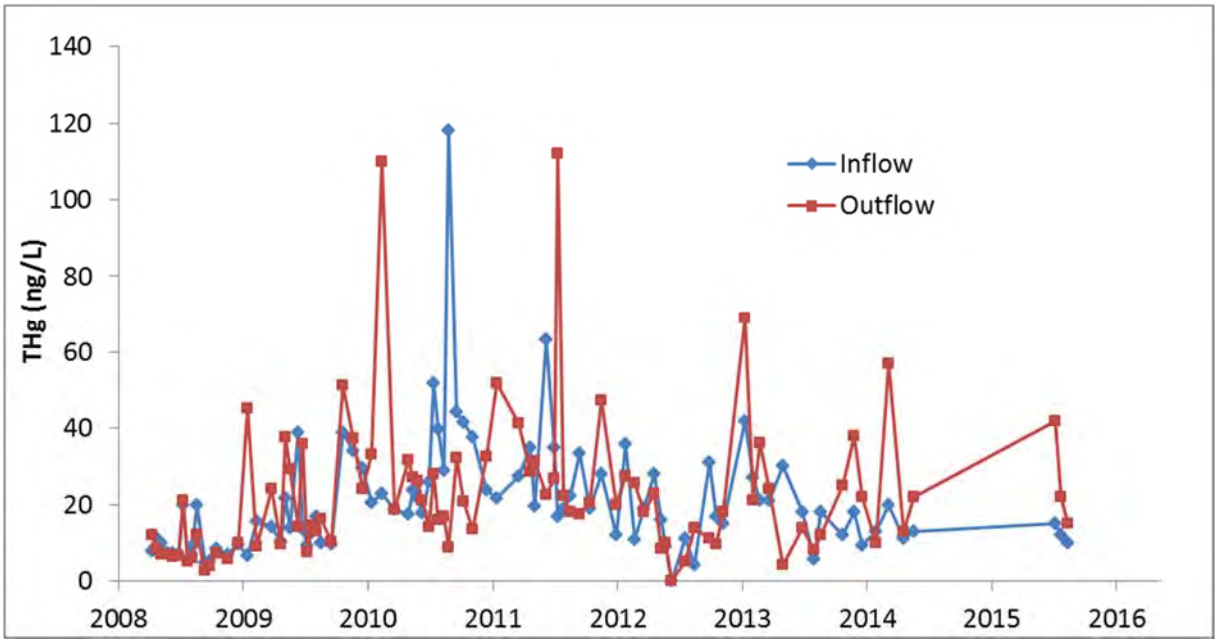
Inflow and outflow concentrations of total mercury and MeHg in years 2008-2015 are shown in **Figure 3**. However, these total mercury concentrations are not statistically significantly different (t-Test for Paired Two Sample for Means, two-tailed p value = 0.39). MeHg concentrations are statistically significantly lower in outflows (t-Test for Paired Two Sample for Means, two-tailed p value = 0.03).

[2] Santa Clara Valley Water District imports water from the State Water Project, which delivers water from several reservoirs in former gold mining areas. and can be delivered to Calero Reservoir upstream of the Project area.

Flow rates into and out of Almaden Lake are not monitored. The best available approximation is the sum of flow data for gages "Golf Creek near McAbee" and "Alamitos Creek at Greystone," representing two major tributaries (albeit not all tributaries) in the lake's watershed. Raw data were downloaded from WISKI (2/18/2016 by Emily Zedler, Associate Engineer for the District) at 15-minute intervals and converted to daily averages. Neither total mercury nor MeHg, in inflows or outflows from the lake, appear related to flow rate into the lake (**Figure 4**). Given that lake releases are uncontrolled, inflow and outflow rates are approximately equivalent, Almaden Lake appears to have no effect on total mercury loads in Alamitos Creek while significantly decreasing its MeHg loads.

These findings contrast with reports for lakes in other climates and with less-contaminated sediments. For example, Wildman (2016) found that mercury concentrations in Grand Lake (Oklahoma) were driven by inflow when inflows were high but that during low inflows, biogeochemistry controlled the enrichment of MeHg in specific locations of the anoxic bottom water and sequestered total mercury and MeHg.

a)



b)

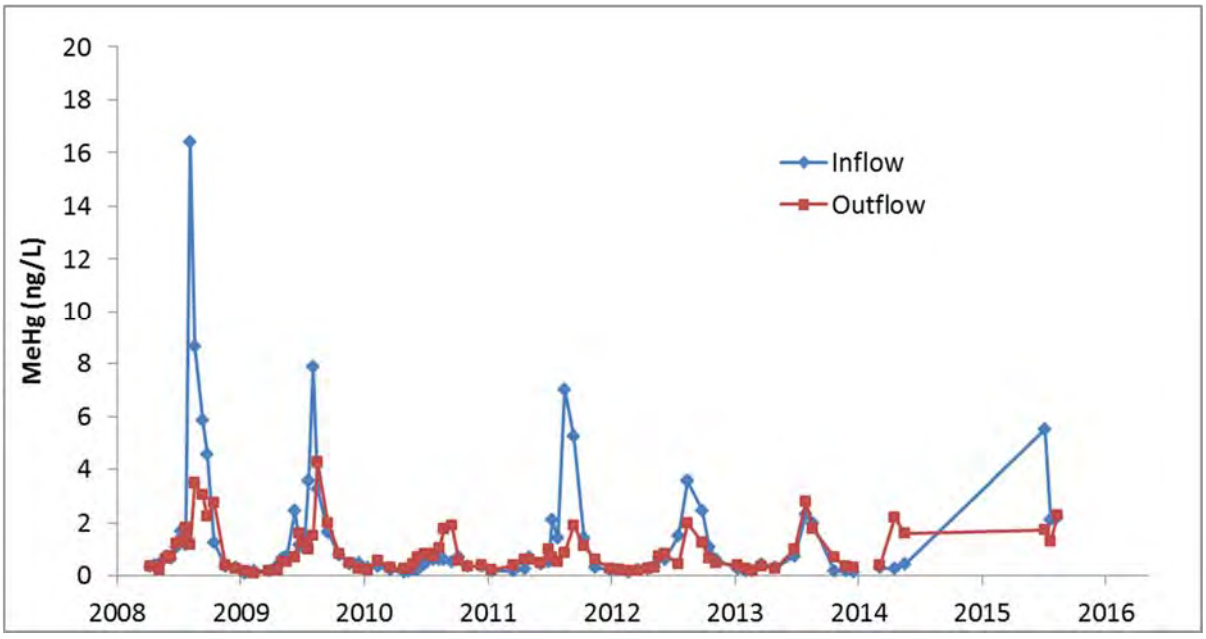


Figure 3. Almaden Lake inflow and outflow concentrations, 2008-2015 for a) total mercury and b) MeHg.

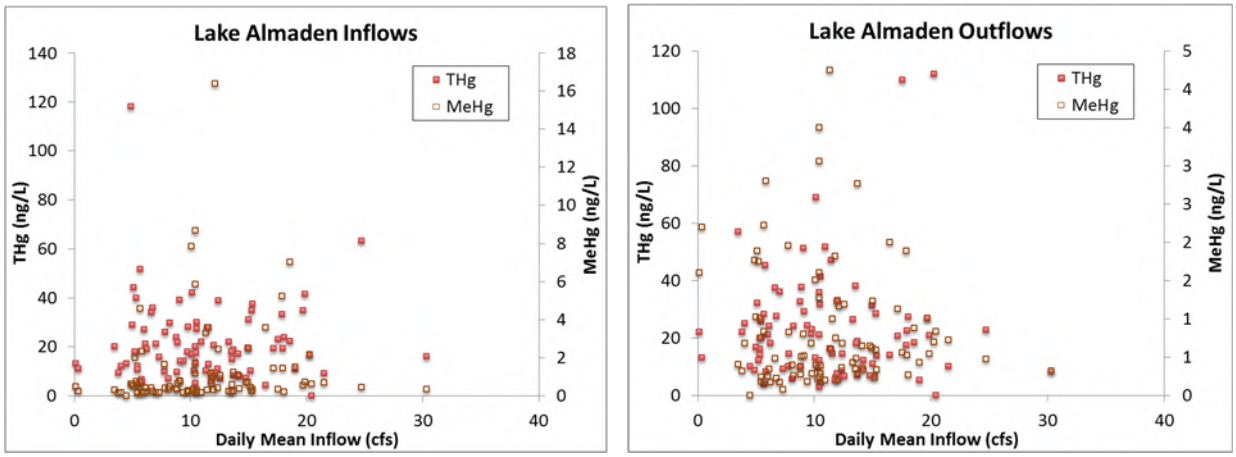


Figure 4. Almaden Lake inflows compared to total mercury (THg) and MeHg concentrations at the lake's inlet (left) and outlet (right).

Lake Stratification

Like most deep, quiescent waterbodies, Almaden Lake becomes thermally stratified between late spring and early fall (June - September, although the exact timing varies annually). The stratification period is characterized by an upper layer (epilimnion) of uniformly warm (20° - 26 ° C), well-mixed water exposed to wind, heat and sunlight. The deeper layer (hypolimnion) is colder (11° - 23° C) and thus more dense. Currently, dry season inflows from Alamitos Creek are also warm, such that the water mixes into the upper layer while its sediment settles to the bottom. Dissolved oxygen becomes depleted

by the bacterial decomposition of organic matter in the water column and at the sediment-water interface. Thermal stratification strength increases over the dry season leading to dissolved oxygen depletion in the hypolimnion. During thermal stratification, fish are largely restricted to the epilimnion. A number of studies elsewhere have shown noteworthy increases in MeHg concentrations in the hypolimnion during stratification (Herrin et al. 1998; Sellers et al. 2001; Watras & Bloom 1992). The vertical mixers (discussed below) reduce—but do not eliminate—the stratification and loss of oxygen in the hypolimnion, and tend to warm the hypolimnion.

There are four distinct areas of significant depth in the lake. The two deepest areas (maximum depths of 13 [Site 1] and 11 meters [Site 2]) are separated from each other and from the portion of the lake through which Los Alamitos Creek enters and exits by remnant dike material that ranges 1 to 2 meters below the surface (SCVWD 2015).

Mercury Contamination in Almaden Lake

In March 2015, four (4) discrete sediment samples were collected from a barge on Almaden Lake from depths between 3 feet to 10 feet below top of sediment. Mercury concentrations ranged from 4.5 to 29 (average 19) mg/kg total mercury. These values are generally high relative to the most commonly used environmental screening level of 1.3 mg/kg (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2016) and the California thresholds for hazardous waste classification (Total Threshold Limit Concentrations) of 20 mg/kg (California Code of Regulations, Title 22, Chapter 11, Article 3). Every sample also exceeded the TMDL allocation that applies to Alamitos Creek of 0.2 mg/kg in suspended sediment (dry weight, annual median) (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008b).

Fish downstream of the New Almaden Mining District have extremely high concentrations of mercury in their tissues. As of 2004, Guadalupe Reservoir had the highest recorded fish mercury concentrations in California—about 20 times higher than the U.S. Environmental Protection Agency (EPA) MeHg criterion. More recently, monitoring of sportfish in 273 reservoirs throughout California identified Almaden Lake as the most contaminated lake, having 2.15 ppm in largemouth bass. Almaden Lake was also notably contaminated for legacy contaminates dichlorodiphenyltrichloroethane (DDT) and chlordanes in common carp (Davis et al. 2010).

To protect the health of humans who consume fish that may be contaminated by mercury, in 1987 Santa Clara County issued a fish consumption advisory warning people not to eat any fish from Guadalupe, Almaden and Calero reservoirs, Guadalupe and Alamitos creeks, the Guadalupe River, and percolation ponds along the river and creeks. The Office of Environmental Health Hazard Assessment (OEHHA) provides fish advisories for guide people in safely consuming local fish. Currently, OEHHA continues to suggest that no one consumes fish from the Guadalupe River Watershed waters because elevated mercury concentrations are unsafe for any individuals (Office of Environmental Health Hazard Assessment 2009).

Lake Mercury Control Tests

The District is pioneering the application of watershed improvement projects, as well as vertical mixers and hypolimnetic oxygenation in reservoirs to address MeHg bioaccumulation. If such projects prove to be useful controls on mercury bioaccumulation in fish, then there are potentially many California lakes, streams, reservoirs, and sloughs where this could be applied to improve the fishability of State waters. Additional benefits of applying such tools include decreased sediment release of nutrients (orthophosphate and ammonia) that exacerbate eutrophication, reduced metals (particularly iron and manganese) that complicate potable water treatment, and compounds toxic to aquatic biota (ammonium and hydrogen sulfide).

The District installed and operates solar-powered circulators in Almaden Lake. The lake currently has three 7500-series and one 5000-series SolarBee® circulators. The first was installed in 2006, a second in 2007, and two more in 2009.

Circulation using solar power is carbon neutral in itself (produces as much energy without producing carbon dioxide as the amount of carbon dioxide produced to generate energy used to manufacture the device), requires trivial infrastructure (cable anchors) and operates solely on solar power. The device draws water through a vertical pipe open at the desired depth to the surface, where it is oxygenated by contact with air and then falls back through the water column, mixing with the ambient water as it descends to its level of neutral buoyancy.

The hypotheses tested by operating the circulators and monitoring conditions in Almaden Lake are:

- Hypolimnetic circulation will reduce MeHg production and accelerate digestion of accumulated organic matter.
- As a result of this action, fish tissue concentrations of MeHg will decrease as compared to previous data.

Data collected since 2006 shows that the circulators in Almaden Lake appear to have affected the seasonal cycling of MeHg most effectively when the intake is set at the bottom. The intake of the circulator near Site 1 was originally set at one meter above the bottom for operation in 2006 and 2007; it was reset at the bottom in early 2008. The intake of the circulator near Site 3 and Site 4 was originally set to circulate the epilimnion but was changed after two years to take water from the bottom. Now all the circulators near Sites 2, 3 and 5 are set at the bottom. In 2009, the circulator at Site 2 malfunctioned and did not provide sufficient circulation to affect MeHg concentrations in the deepest regions of the hypolimnion, which reverted to the pre-circulator seasonal maxima, but it was able to maintain mid-depth concentrations low compared to pre-circulation data (SCVWD 2015).

Effects of In-lake Mercury Controls

The District had found by 2011 that circulation has significant effects on water column MeHg concentration in Almaden Lake but not those in the four studied reservoirs (Drury 2011). Annual maximum concentrations in the hypolimnion vary, and were obviously affected by the circulator after it was set at the bottom in 2008. Focusing on monitoring

Site 1 over the deepest area of the lake (**Figure 5**), in 2005-2007 the annual maximum MeHg concentration in the hypolimnion was about 60 ng/l; in 2009-2013, it was about 15 ng/l, and in 2014-2015 the maximum concentrations were less than 3 ng/l. Nonetheless, even the most recent results continue to exceed the hypolimnetic seasonal maxima concentration target (1.5 ng/l) for several months annually (SCVWD 2015). MeHg concentrations in the epilimnion have not changed significantly over the past decade.

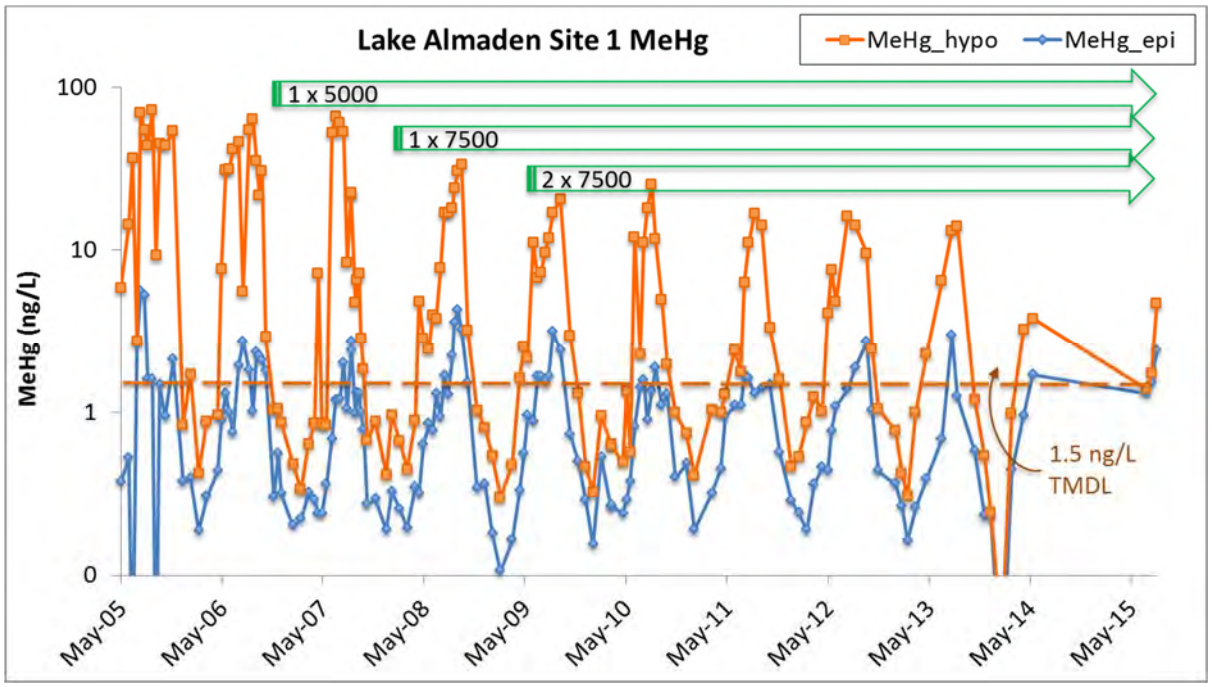


Figure 5. Almaden Lake MeHg concentrations in the epilimnion and hypolimnion, May 2005 - May 2015. Green arrows indicate operating times of vertical mixers. The horizontal dashed line applies to the hypolimnion.

Total mercury and MeHg concentrations in the epilimnion have not changed significantly over the 2005-2015 period (**Figure 6**). Concentrations of total mercury typically exceed the statewide criterion of 50 ng/l as a 30-day average (California Toxics Rule, or CTR; discussed below in section Regulatory Setting). Furthermore, there is no relationship between total mercury and MeHg to indicate that reductions in total mercury would lead directly to commensurate reductions in MeHg (**Figure 7**). These data suggest that the vertical mixers have diluted the highly concentrated hypolimnetic water into the overlying water column without substantially reducing the MeHg concentration exposed to aquatic biota in the epilimnion.

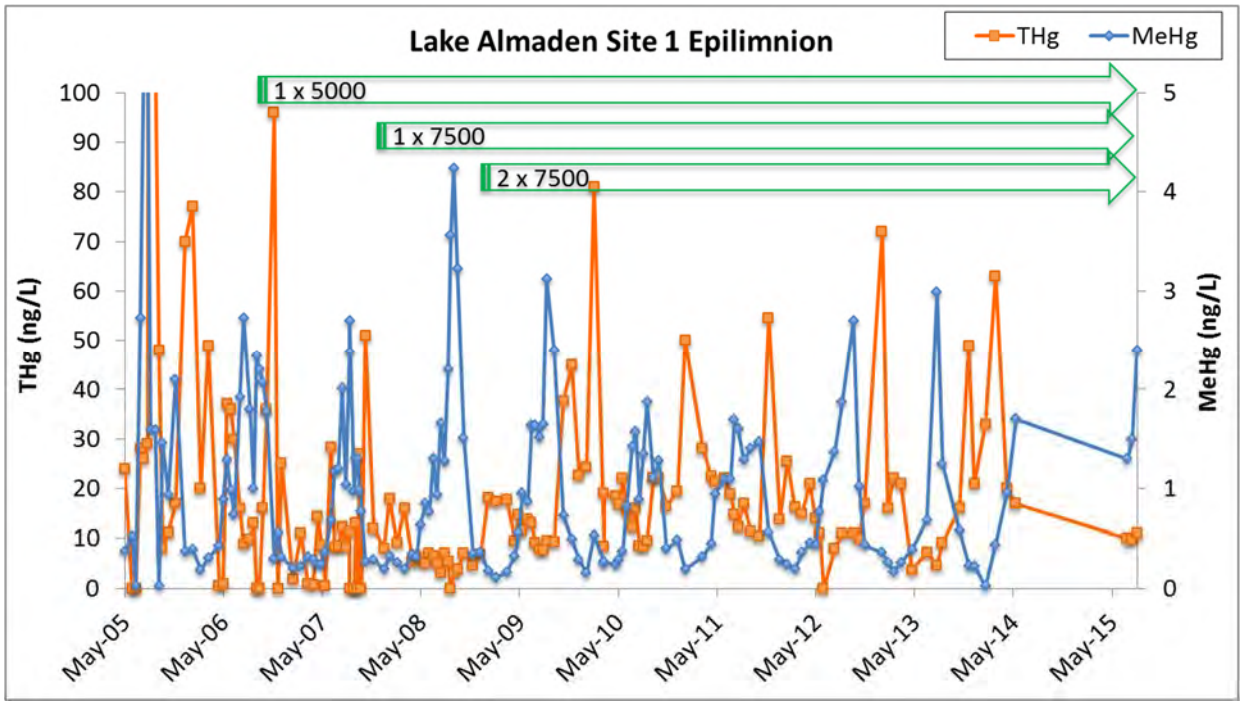


Figure 6. Almaden Lake total mercury (THg) and MeHg concentrations in the epilimnion, May 2005 - May 2015. Green arrows indicate operating times of vertical mixers.

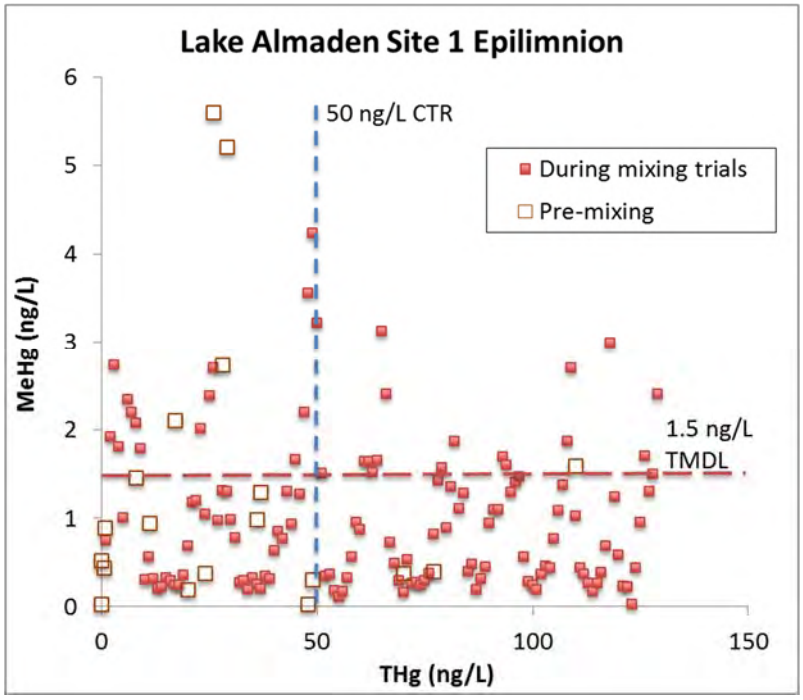


Figure 7. Almaden Lake total mercury (THg) and MeHg concentrations in the epilimnion, May 2005 - May 2015.

As of 2012, reductions in fish tissue mercury concentrations have not been observed (**Figure 8** and SCVWD 2015). Mercury concentrations in both large and small fish continue

to exceed their respective TMDL objectives. While MeHg concentrations in both the epilimnion and hypolimnion decreased during vertical mixing compared to 2005 data, fish tissue concentrations did not respond (**Figure 9**). It is also noteworthy that the rate of MeHg bioaccumulation in Almaden Lake fish is much less than the national average rate (USEPA 2001).

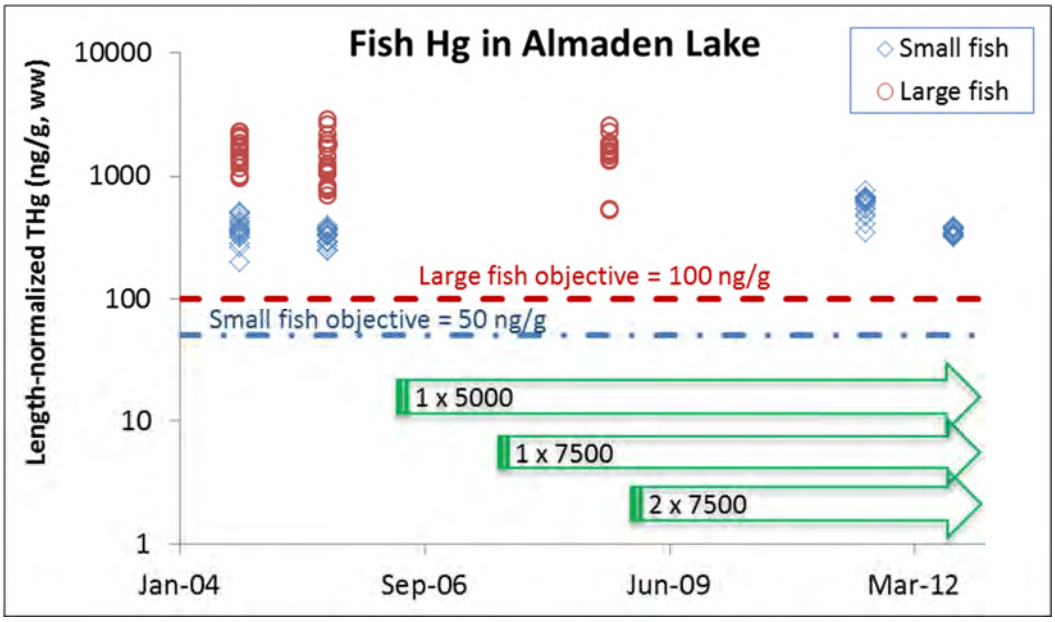


Figure 8. Almaden Lake time series of fish mercury concentrations, compared to TMDL objectives (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008b) and vertical mixer operation periods.

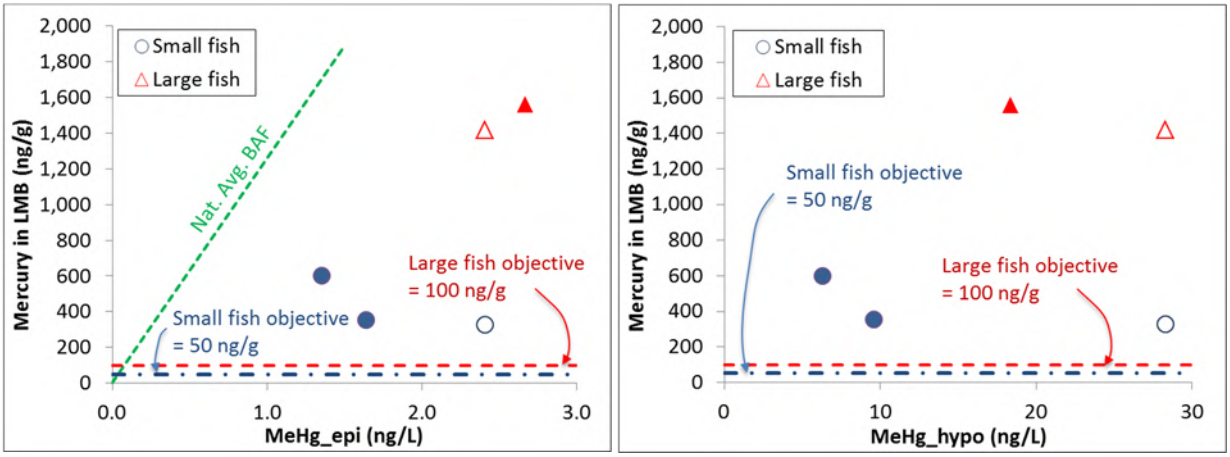


Figure 9. Almaden Lake total mercury concentrations in small and large fish tissue compared to MeHg concentrations in the layers of water: the epilimnion (left) and hypolimnion (right). Open markers are from 2005 prior to operation of mixers; solid markers are during operation of mixers. National average bioaccumulation factor (USEPA 2001) and the TMDL objectives (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008b) are indicated for reference.

Vertical profiles of temperature (which drives stratification) and dissolved oxygen (which drives methylation) are only available for certain months in 2014 and 2015 (**Figure 10**). The two years of data are not directly comparable because measurements are from different seasons (winter-spring in 2014; summer-fall in 2015). Regardless, the pattern is consistent in that while vertical mixer operations maintain a very weakly stratified water column, it does not overcome hypoxia (DO< 2 mg/L) in the deepest region. The MeHg measured in the shallower depths are likely the result of MeHg produced in the bottom sediments, drawn up through the vertical mixers and mixed into the shallower water.

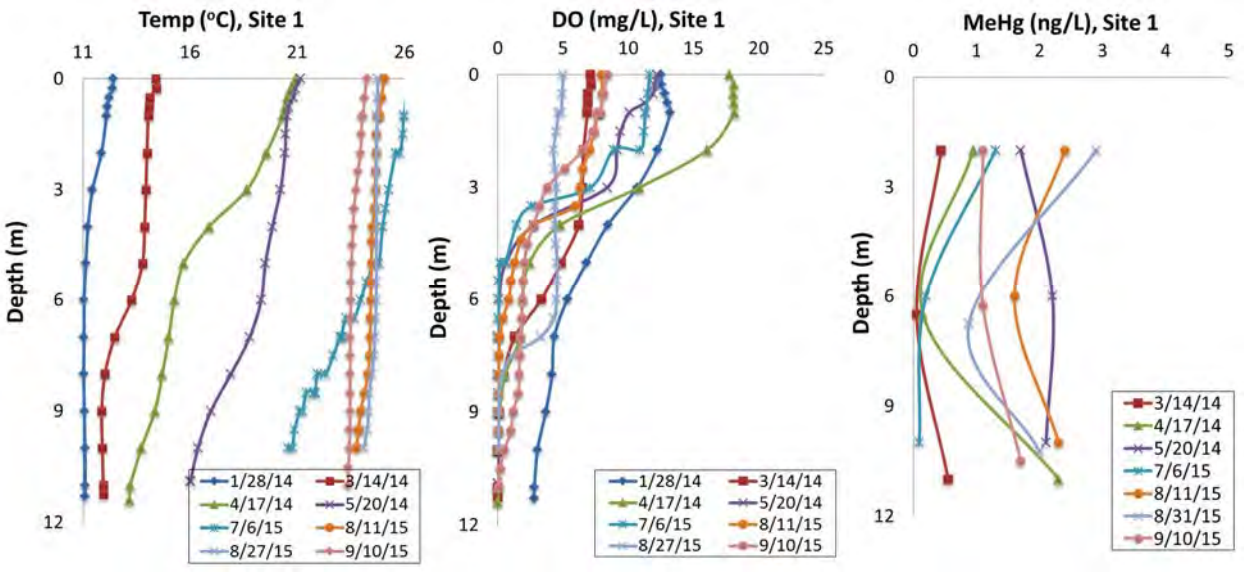


Figure 10. Almaden Lake vertical profiles at Site 1 for temperature, dissolved oxygen (DO), and MeHg, 2014-2015.

Regulatory Setting

Nearly 100 reservoirs throughout California are now listed as having concentrations of mercury in resident sport fish above the USEPA water quality criterion for MeHg of 0.3 mg/kg wet fish muscle tissue for protection of human health (USEPA 2001). The State Water Resources Control Board is developing a statewide regulatory program which will include water quality objectives for MeHg[3]. The primary goal of the proposed program is to reduce concentrations of mercury in fish in order to support the beneficial uses of fish consumption by humans and wildlife.

The spatial patterns observed in fish mercury concentrations statewide indicate that in-lake water quality factors, as well as external loadings, often control mercury concentrations in lake fish. A similar indication of multiple sources and factors influencing fish mercury concentrations has already been accepted and addressed in San Francisco Bay

[3] Program website is http://www.waterboards.ca.gov/water_issues/programs/mercury/.

regulatory programs. This section explains the regulations that have driven the District's MeHg regulatory compliance activities: monitoring, control studies, and this Almaden Lake Project.

First, the use of several similar yet unique regulatory terms used in this section warrant definition.

- **Standard** – The threshold level accepted in order to protect beneficial uses and control the level of contamination (Nath 2009).
- **Criterion** – Used in the Clean Water Act and by USEPA to designate a regulatory standard applied to waters of the US in order to meet water quality standards (USEPA 2010).
- **Objective** – Used in the California Water Code and by state regulators to refer to a regulatory standard applied to waters of the state in order to protect the beneficial uses of waterbodies (California Water Code Sections 13050-13051).
- **TMDL** – A program regulated under the federal Clean Water Act. Literally meaning Total Maximum Daily Load, but effectively referring to the maximum load (or concentration) that a waterbody can receive (or have) while still achieving water quality standards (USEPA 2010).
- **Allocation** – A portion of the TMDL loading capacity applied to specific sources, such as point or nonpoint sources. These are defined as Waste Load Allocations or Load Allocations, respectively (USEPA 1999).
- **Target** – A standard value of a specific pollutant used to set TMDLs and achieve water quality standards (USEPA 1999).
- **Goal** – A non-regulatory standard used to calculate targets or objectives. They do not imply how targets or objectives will be met (National Research Council. Policy Division 1996).

Federal Clean Water Act and California Water Code

The federal Clean Water Act requires California to adopt and enforce water quality standards to protect surface waters. Section 303(d) of the Act requires states to compile a list of "impaired" waterbodies that do not meet water quality standards and to establish Total Maximum Daily Loads (TMDLs) for each impaired waterbody and each pollutant that causes its impairment. A TMDL is the calculation of the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet water quality standards. Allocations of the allowable total pollutant load are classified differently for point sources (such as municipal wastewater outfalls and stormwater drains) and nonpoint sources (such as a lake bottom). TMDLs must account for seasonal variations in water quality, and include a margin of safety to account for uncertainty in predicting how well pollutant reductions will result in meeting water quality standards.

In accordance with California Water Code section 13240, et seq., the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board) has developed and periodically amends its Water Quality Control Plan for the San Francisco Bay Region (Basin Plan). The Basin Plan delineates the applicable water quality standards, which include beneficial uses of waters in the Region, numeric and narrative water quality

objectives to protect those uses, and provisions to enhance and protect existing water quality. A key distinction between federal and state law is that state law requires an Implementation Plan and a monitoring plan to track TMDL effectiveness.

Applicable Water Quality Standards

The designated beneficial uses of waters in the Guadalupe River Watershed, which contains Almaden Lake, include: Cold Freshwater Habitat; Freshwater Replenishment; Groundwater Recharge; Fish Migration; Municipal and Domestic Supply; Preservation of Rare and Endangered Species; Water Contact Recreation; Noncontact Water Recreation; Fish Spawning; Warm Freshwater Habitat; and Wildlife Habitat. Of these, only human consumption of fish (Water Contact Recreation) and wildlife consumption of fish (Preservation of Rare and Endangered Species and Wildlife Habitat) are impaired by mercury.

Superseding the USEPA criterion of 0.3 mg/kg, the Regional Water Board developed and applies the following objectives to Almaden Lake:

- Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered.
- 0.05 mg MeHg per kg fish as average wet weight concentration measured in whole trophic level 3 fish 5–15 cm in length
- 0.1 mg MeHg per kg fish as average wet weight concentration measured in whole trophic level 3 fish 15–35 cm in length[4]

Because mercury concentrations in Almaden Lake fish exceed both the narrative bioaccumulation objective and the numeric aquatic organism and wildlife mercury water quality objectives, the health of piscivorous birds is considered threatened (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008b).

The Basin Plan's mercury water quality objectives also include the following numeric water quality objectives: for municipal supply 2,000 nanograms of mercury per liter of water (ng/L, or parts per trillion); and for toxic effects, 25 ng/L four-day average and 2,400 ng/L one-hour average. In addition, the California Toxics Rule (Code of Federal Regulations, Title 40, §131.38) limits total mercury concentrations in freshwater sources of drinking water to 50 ng/L as a 30-day average. Because these objectives are much greater than the mercury concentrations needed in water to result in protective fish tissue objectives, the fish tissue objective drives the current regulatory approach. Lower MeHg concentrations in water simply serve as a means to the end of lower fish tissue mercury concentrations.

Guadalupe River Watershed Mercury TMDL and Implementation Plan

The Guadalupe River Watershed Mercury TMDL and implementation plan are designed to resolve mercury impairment in waters downstream of mercury mines in the Guadalupe River Watershed, including Alamitos Creek and Almaden Lake (Reg. Wtr. Qual. Ctrl. Bd. –

[4] This objective is one-third of the federal USEPA criterion referenced in the introduction to this Regulatory Setting section.

San Francisco Bay 2008b). The TMDL allocation that applies to Almaden Lake is expressed as 1.5 ng/L MeHg as a seasonal maximum in the hypolimnion. This allocation is 25 times greater than a comparable goal for the nearby Sacramento-San Joaquin Delta of 0.06 ng/L (Wood et al. 2010). The TMDL allocation that applies to Alamitos Creek is 0.2 mg mercury per kg suspended sediment (dry weight, annual median). This allocation is the same as the Baywide suspended sediment mercury concentration target of 0.2 mg mercury per kg dry sediment (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2006).

The Guadalupe River Watershed mercury TMDL's implementation is planned to proceed in two phases. The goals for the first phase, beginning January 1, 2009, include implementing effective source control measures for mining waste at mine sites; completing studies to reduce discharge of mining waste accumulated in Alamitos Creek; and completing studies of MeHg and bioaccumulation controls in reservoirs and lakes, by December 31, 2018. The goal for the second 10-year phase of implementation is the attainment of the watershed fish tissue targets and the San Francisco Bay mercury TMDL allocations to urban stormwater runoff and legacy mercury sources in the Guadalupe River Watershed, by December 31, 2028.

Other Applicable Regulations

Other regulations also apply to the Project, which may lead to additional mercury controls (**Table 1**). In all instances, the TMDL described above would guide implementation of those regulations or simply supersede them.

Table 1. Other Surface Water and Sediment Quality Regulations for Mercury That Apply to the Project

Regulation	Implementing Agency	Regulation Summary	Applicability to Almaden Lake Project
Federal Regulations			
Clean Water Act, Section 401	Delegated to the State Water Resources Control Board (SWRCB) and the Regional Water Board	A Federal agency cannot issue a license or permit to conduct any activity that may result in a discharge into waters of the United States until the state government of the state where the discharge would originate has granted or waived a Section 401 Certification that any such discharge will not violate state water quality standards.	Project activity includes filling waters of the United States with a levee and clay cap, so a water quality certification would be required.
Clean Water Act, Section 402	SWRCB responsible for permit administration; permit issued by Regional Water Board	Used to implement the NPDES program, which regulates all discharges of pollutants from point-source waters of the United States. Includes long-term and temporary (construction-related) discharge permits.	Construction of the project would require compliance with the State's general permit for construction-related stormwater runoff. As part of the project, the contractor would prepare, submit, and follow a SWPPP; this plan would describe BMPs and other measures that would be applied during project construction to avoid or minimize impacts on water quality, including mercury.
Clean Water Act, Section 404	The USACE authorizes the discharge of fill to waters of the United States. The U.S. Environmental Protection Agency has oversight authority.	Regulates discharges of dredged or fill material into waters of the United States.	Project activity could require the discharge of fill material to waters of the United States for construction of the levee and leveling and capping the lake sediment bed. Because of this, the project would require compliance with the existing Nationwide Permit program or a separate general permit.
State Regulations			
Porter-Cologne Water Quality Control Act	SWRCB; some regulatory authority delegated to the Regional Water Board	Authority to regulate discharges of waste into waters of the State, which are defined as "any surface or groundwater, including saline water, within the boundaries of the State" (California Water Code, Section 13050). This definition includes, but is broader than, waters of the United States. Primarily implemented through waste discharge requirements (WDRs).	The District would need to receive a WDR for the proposed Project and for future discharges to Almaden Lake, even if it is hydrologically separated from Alamitos Creek.
California Water Code		Dictates that the water resources of the State of California meet their beneficial uses to the fullest extent of which they are capable and that the conservation of water is exercised in the interest of the people and for public welfare. Section 8100 et. seq. of the Code contains guidelines for the construction of public works and improvements including the protection and restoration of watersheds, levees, or check dams to prevent overflow or flooding, conservation of the floodwaters, and the effects of construction projects on adjacent counties (especially upstream and downstream along a river).	Beneficial uses identified in the San Francisco Bay Basin Plan must be protected (such as through WDRs). Levee construction must comply with State requirements.
California Code of	Department of Toxic Substances	The California thresholds for hazardous waste classification is 20	The fill material (not including the clay cap layer) must hold to this

Regulation	Implementing Agency	Regulation Summary	Applicability to Almaden Lake Project
Regulations, Title 22, Chapter 11, Article 3	Control	mg/kg	standard
Regional Regulations			
Tier one environmental screening levels	San Francisco Bay Regional Water Quality Control Board	Mercury content cannot exceed 6.7 mg/kg	The 2.5-ft clay clap layer must comply with this standard

Findings from Implementing the Investigation Plan

A previous deliverable was an Investigation Plan, which summarized current information gaps and provided a plan for acquiring missing information. The information compiled was then used to describe the conditions at the Almaden Lake Project area related to mercury contamination. Much of the data presented above in section Physical Setting were obtained by implementing the Investigation Plan.

An additional component of the Plan was a site visit with District staff on February 9, 2016. We observed the vertical mixers in operation; noted the current lake orientation, use areas, bathymetry, and Alamitos Creek inlet and outlet; and visualized the proposed Project changes to Alamitos Creek, lake bathymetry, vertical mixers, and use areas. We also toured the downstream percolation pond and diversion structure.

Mercury-Related Impacts of the Project

A primary Project objective is to improve mercury conditions in Almaden Lake. Relevant to that objective, the current lake configuration and operation present the following conditions:

- Almaden Lake's sediments are highly contaminated with mercury from the historical mining legacy and a continuing supply of mercury-laden sediments from Alamitos Creek. Although upstream watershed improvement projects and sediment trapping in Almaden Reservoir likely have improved conditions, they appear inadequate to attain the regulatory requirements.
- MeHg appears to be produced in the hypolimnion of Almaden Lake during periods of hypoxia. Solar-powered vertical mixers installed and operated since 2006 appear to mix the MeHg-rich deep water into the epilimnion, but do not significantly reduce MeHg concentrations in the epilimnion. A very weakly stratified water column persisted in 2014-2015 almost throughout the year, which did not overcome hypoxia (DO< 2 mg/L) in the deepest region.
- Mercury concentrations in both large and small fish have not decreased since 2005, and both size classes continue to greatly exceed their respective TMDL objectives.

A California Environmental Quality Act (CEQA) analysis characterizes environmental impacts of a project and identifies appropriate mitigation, whereas in this case with existing mercury contamination there is an existing deleterious condition on site, which the Project is designed to address. Specifically:

- Separating Alamitos Creek from the lake would disconnect the ongoing supply of mercury-laden sediments from the watershed into the lake [see section Inflow and Outflow Mercury Concentrations].

- Capping the current lake sediment bed, which is highly contaminated with mercury [see section Mercury Contamination in Almaden Lake], with a clean, impermeable clay layer will minimize the flux of MeHg from the underlying sediments.
- Recontouring (filling and flattening) the lake sediment bed will eliminate deep, isolated pockets which currently appear to become hypoxic first and to produce the highest concentrations of MeHg [see section Lake Mercury Control Tests].
- Continuing to operate the vertical mixers, adding more mixers, and reducing the lake volume will slow the loss of dissolved oxygen, which triggers methylation [see section Effects of In-lake Mercury Controls].

The preceding analysis substantiates that overall the Project will be beneficial to mercury exposure. Nonetheless, the following analysis identifies ways in which the Project could cause counterproductive, negative impacts to mercury exposure.

Regarding Almaden Lake, algae concentrations are likely to decrease as the organic, nutrient-rich lake sediment bed is covered with a clay cap. Nonetheless, over time (on the order of a decade), algae concentrations can be expected to increase as new sediments and decomposing algae accumulate in the lake sediment bed. Also, if nutrient-rich recycled water is used as the source water to manage water levels in Almaden Lake, the higher nutrient load would encourage eutrophication in the lake. Eutrophication increases the concentration of organic matter in the water column, which eventually settles to the lake sediment bed where bacterial decomposition consumes oxygen leading to hypoxia. As discussed above, hypoxia tends to trigger MeHg production.

Regarding Alamitos Creek, the preferred project alternative design consists of a low-flow channel and a shallow, vegetated, periodically inundated floodplain constrained by setback levees from the adjacent lake and lands. This design may have the following mercury-related impacts:

- Mercury concentrations in fish sampled from large watersheds tend to increase with the percent of wetland area (Brumbaugh et al. 2001). Although the design reduces the overall wetland area from the lake area to the floodplain area, the floodplain could serve as an efficient mercury methylation environment for in-stream biota.
- Aquatic plants will grow in the shallow floodplain, as they currently do downstream by the diversion structure. If that occurs, organic material would accumulate in the floodplain. Labile carbon in organic-rich substrates has been found to methylate mercury efficiently (Windham-Myers et al. 2014).

Mitigation and Avoidance Measures

Broadly, water managers have several types of mercury mitigation measures available (Davis et al. 2012). How those measures could be applied for the Project is summarized as follows.

- **Watershed source control**: The District and others are actively controlling legacy mercury sources in the watershed. The Project will separate Alamitos Creek—the

lake's source of mercury-laden sediments—from the lake with either water source option. With a flow-control structure, (if the creek remains as the lake's primary water source) diversions could be restricted to periods when turbidity in the creek is relatively low. If recycled water is the primary source, the watershed mercury source would be eliminated.

- **In-lake control**: Within the lake itself, the Project also will reduce internal sources from the lake sediment bed by filling in deep pockets to a shallower depth, covering the entire lake sediment bed with a clay cap, and filling in some submerged areas completely. Clay caps provide effective barriers to sediment flux of soluble compounds (Himmelheber et al. 2008).
- **Destratification**: The Project will continue to operate and monitor four solar-powered vertical mixers, and install two additional mixers to counteract the effects of stratification. The mixers will be operated to increase dissolved oxygen concentrations at the sediment-water interface and in the overlying water column in order to minimize mercury methylation.
- **Food web—top down**: The TMDL for the Guadalupe River Watershed is approached from the perspective of improving the waterbody to support a more robust fishery. This approach would couple improved fish populations with less MeHg, in effect comparatively spreading less mercury amongst more fish so that each fish has less mercury than currently (Pickardt et al. 2002). The lake currently supports a population of predatory largemouth bass, which accumulate MeHg through their diet. Draining all/most of the lake for the Project will remove the fishery. How the lake will be re-stocked is undetermined. If predatory fish return, measures to eliminate them could be contemplated, although actual achievement of these results is problematic (SCVWD 2009). Alternatively, periodically harvesting large fish could potentially shift the balance of fish populations towards smaller fish.
- **Food web—bottom up**: The City or District may add algaecide or dye to the lake to control the formation of algae generated from the higher concentration of nutrients in the recycled water than in Alamitos Creek water. This practice would slow the accumulation of organic matter in the lake sediment bed, which leads to hypoxia and MeHg production. Conversely, this practice could work against the principle of biodilution (Slotton et al. 1995).
- **Outreach and education**: If, after all other mitigation measures are implemented, the lake remains impaired by mercury, public outreach messaging will be used to warn anglers and potential consumers of lake fish of the health risks associated with eating mercury-laden fish from the lake. Local health officials and the District already outreach about fish mercury conditions in the region, and the state's Office of Environmental Health Hazard Assessment has posted advisories for limiting consumption of fish from Alamitos Creek and upstream reservoirs.

The District will continue to test the hypothesis that vertical mixers in the lake can reduce mercury bioaccumulation. The District will continue to monitor water quality in Almaden Lake and adaptively managing the system. Adjustments to the current monitoring plan could include:

- Monitor dominant algae species present in the epilimnion every 1-2 months, particularly capturing algae blooms (chlorophyll *a* >> 5 µg/L).
- Analyze and report zooplankton mercury content as Total Mercury only and on the standard dry-weight basis.
- Identify zooplankton species and record total length of plankton net tows to estimate volumetric concentrations. Seasonal shifts in zooplankton species composition and density could be overlaid on time series of water column MeHg to evaluate which species (each with characteristic exposure and predation) drive MeHg biomagnification into trophic level 3 fish.
- Ensure that profiles of field measurements and samples are collected at least 56 feet (2x water depth) away from any vertical mixer.
- Ensure that fish sampling monitors the dominant fish community. Solely using shoreline sampling may bias fish in the littoral (near shore) habitats while missing pelagic (open water) fish more exposed to aeration effects.

Regarding the creek, the future creek cross-section will minimize the seasonally shallow floodplain area, which is typically an important area of MeHg production (McCord and Heim 2015). The ideal elevation of the floodplain would be level with the low-flow water surface. With this design, winter season flows will be contained in the low-flow channel while the floodplain would be inundated only when the flashboards at the downstream diversion structure are installed. If high flows with the flashboard dam removed do not scour accumulated organic material from the low-flow channel or its floodplain, accumulated sediments will be removed in the channel as part of the Stream Maintenance Program.

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Appendix A – Acronyms and Abbreviations

Algaecide – A chemical added to lake water to kill algae

Anadromous – A fish that spends the majority of its life at sea, but returns to freshwater to spawn

Anoxia – The absence of oxygen

Basin Plan – Common-use term for the Water Quality Control Plan for the San Francisco Bay Basin

DDT – dichlorodiphenyltrichloroethane, a colorless, crystalline, tasteless and almost odorless organochloride known for its insecticidal properties

Epilimnion – The surface mixed layer in a vertically stratified lake

Eutrophication – Excessive productivity in an aquatic ecosystem

Hypolimnion – The deep, isolated layer in a vertically stratified lake

Hypoxia – A condition of defficient oxygen, stressing aerobic organisms and initiating alternative redox reactions for as energy sources

Labile carbon – Reactive, bioavailable carbon

Littoral – The shoreline zone of a lake

MeHg – Methylmercury, a highly bioaccumulative, toxic form

OEHHA – Office of Environmental Health Hazard Assessment

Pelagic – The open water zone of a lake

Photodemethylation – A chemical reaction driven by solar radiation which oxidizes methylated mercury back to its ionic form

Piscivorous – Fish eating

Regional Water Board – Regional Water Quality Control Board, of which the San Francisco Bay Regional Board regulates water quality in California

THg – unfiltered, total mercury

TMDL – Total Maximum Daily Load, a federal program regulated by section 303(d) of the Clean Water Act which includes a calculation of the maximum amount of a pollutant that can occur in a waterbody and allocates the necessary reductions to one or more pollutant sources

Appendix F
Noise



F.1 Noise Monitoring Data



METROSONICS db-308 SN 2456 V2.3 3/87

CURRENT DATE: 9/09/16
CURRENT TIME: 15:55:36

_____

_____

_____

_____

CALIBRATED: 9/08/16 @   9:56:13

DISPLAY RANGE: 42.0dB TO 138.0dB

DOUBLING RATE: 3 dB

FILTER: A WGHT

RESPONSE: SLOW

SCHEDULED RUN: OFF

   START DATE: 7/25/16
   START TIME:12:11:00
   LENGTH: 0:15:00

** OVERALL REPORT **

TEST STARTING DATE: 9/09/16
TEST STARTING TIME: 10:34:48
TEST LENGTH: 0DAYS 1:01:34

Lav   = 66.3dB
Lav 80= 42.0dB
Lav 90= 42.0dB
SEL   =101.9dB

Lmax = 79.7dB ON 9/09/16 @ 11:57:00
Lpk < 117dB

TIME OVER 115dB 0D 0:00:00.00

DOSE CRITERION: 90dB

```
 8 HR DOSE ( 80dB CUTOFF)=  0.00%
 8 HR PROJ. DOSE ( 80dB CUTOFF)=  0.00%
 8 HR DOSE ( 90dB CUTOFF)=  0.00%
 8 HR PROJ. DOSE ( 90dB CUTOFF)=  0.00%


** TIME HISTORY REPORT **

MODE: CONTINUOUS
PERIOD LENGTH:  0:15:00
TIME HISTORY CUTOFF: NONE
Ln(1): 33.0%  Ln(2): 90.0%

 INT#   START    Lav    Lmax   Lpk
 TAG#   TIME      ET     L1    L2
_____________________________________

    1  9/09/16   48.3    49.9 <117       * +
    0 10:34:48  PARTIAL  48     47

    2  9/09/16   52.0    67.8 <117            *                 +
    0 10:37:12  0:15:00  50     48

    3  9/09/16   59.0    69.5 <117                    *           +
    0 10:52:12  PARTIAL  50     47

    4  9/09/16   55.4    78.7 <117                *                          +
    0 11:08:57  0:15:00  53     49

    5  9/09/16   51.0    52.1 <117          * +
    0 11:23:57  PARTIAL  51     49

    6  9/09/16   71.8    79.7 <117                                    *         +
    0 11:42:48  0:15:00  72     60

    7  9/09/16   75.7    77.9 <117                                          * +
    0 11:57:48  PARTIAL  76     72

    8  9/09/16   59.2    76.4 <117                    *                  +
    0 12:10:02  0:15:00  56     48

    9  9/09/16   49.7    54.7 <117         *     +
    0 12:25:02  PARTIAL  48     47


** AMPLITUDE DISTRIBUTION REPORT **
```

TOTAL SAMPLES = 29552

dB	SAMPLES		% OF TOTAL
45	51	+	.17
46	264	*	.89
47	957	***	3.23
48	2105	*******	7.12
49	3546	**********	11.99
50	2853	**********	9.65
51	2504	********	8.47
52	2647	*********	8.95
53	1984	*******	6.71
54	1278	****	4.32
55	832	***	2.81
56	691	**	2.33
57	460	**	1.55
58	437	*	1.47
59	468	**	1.58
60	475	**	1.60
61	520	**	1.75
62	452	**	1.52
63	490	**	1.65
64	516	**	1.74
65	578	**	1.95
66	557	**	1.88
67	518	**	1.75
68	428	*	1.44
69	413	*	1.39
70	365	*	1.23
71	402	*	1.36
72	380	*	1.28
73	405	*	1.37
74	454	**	1.53
75	634	**	2.14
76	573	**	1.93
77	257	*	.86
78	45	+	.15
79	13	.	.04

Ln(0.0) = 79dB
Ln(10.0) = 71dB
Ln(50.0) = 52dB
Ln(99.9) = 45dB

NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF

Ldod	63.9dB	42.0dB	42.0dB
Losha	62.4dB	42.0dB	42.0dB
Leq(6)	61.4dB	42.0dB	42.0dB

SOUND LEVEL MEASUREMENTS

DATE: 9-9-2016

Investigator(s): Todd Haurin | Project Name: Almaden Lake | Project Number: D130679.00

LOCATION OF MEASUREMENT

Almaden Lake Village

INSTRUMENTATION	TYPE	SERIAL NO.
SLM	db-308	2456
MICROPHONE		
FILTER		
CALIBRATOR		
RECORDER		

AUDIBLE SOURCES

Birds, distant aircraft, vehicles on nearby roads, voices of adjacent residents

CONDITIONS

TIME	TEMP	R. HUMID	W. SPEED	W. DIR
10:38am	72°F	57%	~~SE~~ 3 MPH	SE

WEIGHTING: [✓] A [ ] B [ ] C [ ] FLAT

OPER. MODE: [✓] SLOW [ ] FAST [ ] PEAK [ ] IMPULSE

RECORDER CHART ATTACHED: [✓] YES [ ] NO

TIME PERIOD 10:38am - 10:53am

DESCRIPTION OF CONDITIONS

Sunny, clear skies, light breeze, warm

STATISTICAL RESULTS

Lav = 52.0

Lmax = 67.8

SOUND LEVEL MEASUREMENTS

DATE: 9-9-2016

Investigator(s):	Project Name: Almaden Lake	Project Number: D130679.20

LOCATION OF MEASUREMENT

Le Mirador Senior Apartments

INSTRUMENTATION	TYPE	SERIAL NO.
SLM	db-308	2456
MICROPHONE		
FILTER		
CALIBRATOR		
RECORDER		

AUDIBLE SOURCES

Birds, vehicles on Almaden Expressway, voices of adjacent residents

CONDITIONS

TIME	TEMP	R. HUMID	W. SPEED	W. DIR
11:09am	72°F	57%	4mph	W

LIGHTING	☐ A	☐ B	☐ C	☐ FLAT
OPER. MODE	☐ SLOW	☐ FAST	☐ PEAK	☐ IMPULSE
RECORDER CHART ATTACHED		☐ YES	☐ NO	

TIME PERIOD 11:09am - 11:24am

DESCRIPTION OF CONDITIONS

Sunny, clear skies, light breeze, warm

STATISTICAL RESULTS

Lav = 55.4

Lmax = 78.7

SOUND LEVEL MEASUREMENTS

PAGE 3 OF 4

DATE: 9-9-2016

Investigator(s):	Project Name:	Project Number:

LOCATION OF MEASUREMENT

Lot adjacent to Porto Alegre Ct. + Almaden

INSTRUMENTATION	TYPE	SERIAL NO.
SLM	db-308	2456
MICROPHONE		
FILTER		
CALIBRATOR		
RECORDER		

AUDIBLE SOURCES

Vehicles on Almaden Expressway, Nearby garbage truck, nearby resident's pump motor, aircraft overhead

CONDITIONS

TIME	TEMP	R. HUMID	W. SPEED	W. DIR
11:43am	77°F	48%	5 mph	ENE

LIGHTING	☐ A	☐ B	☐ C	☐ FLAT
OPER. MODE	☐ SLOW	☐ FAST	☐ PEAK	☐ IMPULSE
RECORDER CHART ATTACHED			☐ YES	☐ NO

TIME PERIOD 11:43am-11:58am

DESCRIPTION OF CONDITIONS

Sunny, clear skies, light breeze, warm

STATISTICAL RESULTS

Lav = 71.8

Lmax = 79.7

SOUND LEVEL MEASUREMENTS

PAGE 4 OF 4

DATE: 9-9-2016

Investigator(s): Todd Haurin	Project Name: Almaden Lake	Project Number: D130679.00

LOCATION OF MEASUREMENT

Terrace View Dr.

INSTRUMENTATION	TYPE	SERIAL NO.
SLM	db-308	2456
MICROPHONE		
FILTER		
CALIBRATOR		
RECORDER		

AUDIBLE SOURCES

Vehicles on Winfield Blvd, birds, pedestrians talking,

CONDITIONS

TIME	TEMP	R. HUMID	W. SPEED	W. DIR
12:10pm	77°F	49%	6 mph	NE

LIGHTING	☐ A	☐ B	☐ C	☐ FLAT
OPER. MODE	☐ SLOW	☐ FAST	☐ PEAK	☐ IMPULSE
RECORDER CHART ATTACHED			☐ YES	☐ NO

TIME PERIOD 12:10pm – 12:25 pm

DESCRIPTION OF CONDITIONS

Sunny, clear skies, light breeze, warm

STATISTICAL RESULTS

Lav = 59.2

Lmax = 76.4

F.2 Construction Equipment Noise Level Estimates

ESA

F.2 - Construction Equipment Noise Level Estimates

Equipment	Reference Noise Level*	Distance to Receptor	Number of equipment	Hourly Usage	Lmax	Combined Lmax	Leq(h)	Combined Leq(h)
Creek Diversion								
Crane	80.6	400	1	16	58.0	**78.4**	50.1	**71.6**
Vibratory Pile Driver	100.8	400	1	20	78.2		71.2	
Pumps	80.9	400	3	50	63.1		60.1	
Levee Footprint								
Cement and Mortar Mixers	78.8	200	1	40	63.7	**77.5**	59.8	**73.3**
Graders	85	200	2	40	73.0		69.0	
Off-Highway Trucks	76.5	200	2	40	64.5		60.5	
Other Material Handling Equipme	85	200	1	50	69.9		66.9	
Plate Compactors	83.2	200	2	20	71.2		64.2	
Pumps	80.9	200	1	50	65.8		62.8	
Rubber Tired Dozers	81.7	200	1	40	66.6		62.7	
Dewatering								
Pumps	80.9	300	1	50	61.4	**61.4**	58.4	**58.4**
Working Surface/V & DR								
Excavators	80.7	250	3	40	68.0	**70.6**	64.0	**66.7**
Rubber Tired Dozers	81.7	250	2	40	67.2		63.3	
Lake & Levee FA								
Graders	85	250	1	40	67.5	**71.4**	63.5	**66.1**
Off-Highway Trucks	76.5	250	1	40	59.0		55.0	
Plate Compactors	83.2	250	2	20	68.7		61.7	
Islands (expanded and new)								
Graders	85	450	2	40	64.2	**68.1**	60.2	**62.7**
Off-Highway Trucks	76.5	450	2	40	55.7		51.7	
Plate Compactors	83.2	450	4	20	65.4		58.4	
Transfer PL (from AVPL)								
Concrete Saw**	89.6	30	1	20	95.1	**95.1**	88.2	**88.2**
Cranes	80.6	40	1	16	83.0	**92.6**	75.1	**88.7**
Excavators	80.7	50	1	40	80.7		76.7	
Other Construction Equipment	85	30	1	50	90.5		87.5	
Plate Compactors	83.2	50	1	20	83.2		76.2	
Rubber Tired Loaders	79.1	40	1	40	81.5		77.5	
Lake Area 2.5 CC								
Graders	85	250	1	40	67.5	**71.4**	63.5	**66.1**
Off-Highway Trucks	76.5	250	1	40	59.0		55.0	
Plate Compactors	83.2	250	2	20	68.7		61.7	
Alamitos RCA 2.5 CC								
Graders	85	325	1	40	64.7	**67.2**	60.7	**62.4**
Off-Highway Trucks	76.5	325	1	40	56.2		52.2	
Plate Compactors	83.2	325	1	20	62.9		55.9	
Transfer PL (to LAPP)								
Concrete Saw**	89.6	100	1	20	82.1	**82.1**	75.1	**75.1**
Cranes	80.6	110	1	16	72.0	**80.8**	64.1	**76.5**
Excavators	80.7	120	1	40	71.2		67.2	
Other Construction Equipment	85	100	1	50	77.5		74.5	
Plate Compactors	83.2	120	1	20	73.7		66.7	
Rubber Tired Loaders	79.1	110	1	40	70.5		66.6	
New Park								
Graders	85	300	1	40	65.5	**69.5**	61.6	**64.1**
Off-Highway Trucks	76.5	300	1	40	57.0		53.1	
Plate Compactors	83.2	300	2	20	66.8		59.8	
Alamitos Creek WBSG								
Graders	85	400	1	40	62.4	**65.0**	58.4	**60.1**
Off-Highway Trucks	76.5	400	1	40	53.9		49.9	
Plate Compactors	83.2	400	1	20	60.6		53.6	
Reveg & Landscaping								
Excavators	80.7	30	1	40	86.2	**89.2**	82.3	**85.7**
Generator Sets	80.6	30	1	50	86.1		83.1	
Repaving								
Paver	77	30	1	50	82.5	**87.3**	79.5	**82.1**
Roller	80	30	1	20	85.5		78.6	

*See Appendix F.3, Roadway Construction Noise Model Output, for reference noise levels.

**It is assumed that concrete saws would not operate at the same time and vicinity as the other pipeline installation equipment.

F.3 Roadway Construction Noise Model Output

ESA

Construction Noise Output
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 03/05/2019
Case Description: Almaden Lake Improvements Project

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Reference Noise levels	Residential	50.0	40.0	30.0

Equipment Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	50.0	0.0
Vibratory Pile Driver	No	20		100.8	50.0	0.0
Pumps	No	50		80.9	50.0	0.0
Concrete Mixer Truck	No	40		78.8	50.0	0.0
Grader	No	40	85.0		50.0	0.0
Dump Truck	No	40		76.5	50.0	0.0
All Other Equipment > 5 HP	No	50	85.0		50.0	0.0
Compactor (ground)	No	20		83.2	50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Excavator	No	40		80.7	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0
Generator	No	50		80.6	50.0	0.0
Soil Mix Drill Rig	No	50	80.0		50.0	0.0

Construction Noise Output

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Pile Driver	100.8	93.8	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	80.9	77.9	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	78.8	74.8	N/A	N/A	N/A	N/A	N/A	N/A
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	76.5	72.5	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	85.0	82.0	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	83.2	76.2	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A
Generator	80.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A
Soil Mix Drill Rig	80.0	77.0	N/A	N/A	N/A	N/A	N/A	N/A
Total	100.8	94.9	N/A	N/A	N/A	N/A	N/A	N/A

Combine with othe RCMN file
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/16/2019
Case Description: Almaden Lake

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residence	Residential	50.0	45.0	40.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	50.0	0.0
Roller	No	20		80.0	50.0	0.0
Concrete Saw	No	20		89.6	50.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Paver	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	80.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.6	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

F.4 Traffic and Pump Station Noise Estimates

ESA

Traffic Noise Baseline Ldn

Winfield Blvd Thursday, 6/2/16

			Penalization	
			10 dBA (Ldn)	5 dBA (CNEL)
TIME	dBA	micro pascals	micro pascals	micro pascals
0 / 24	46.2	41234	412343	130394
100	44.8	30383	303832	96080
200	42.9	19532	195321	61766
300	42.9	19532	195321	61766
400	47.8	60766	607664	192160
500	50.7	117192	1171923	370595
600	55.8	379790	3797900	1201001
700	57.1	512174	5121739	1619636
800	58.1	642388	6423876	2031408
900	58.0	629366	6293662	1990231
1000	57.9	622856	6228555	1969642
1100	58.1	646728	6467280	2045134
1200	57.8	605494	6054937	1914739
1300	58.2	659749	6597494	2086311
1400	57.7	588132	5881319	1859836
1500	58.0	638047	6380471	2017682
1600	58.8	761750	7617501	2408865
1700	58.7	735707	7357074	2326511
1800	58.7	735707	7357074	2326511
1900	57.5	559919	5599189	1770619
2000	57.2	525195	5251953	1660813
2100	57.0	505663	5056632	1599047
2200	54.9	310343	3103426	981390
2300	51.1	130214	1302137	411772

Low 57.094174
High 58.818125

Leq Daytime 8:00 am-5:00 p.m.
58.1 dBA

Leq Daytime 7:00 am-7:00 p.m.
58.1 dBA

Leq 24-Hour
56.4 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
59.3 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
60.0 dBA **and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.**

CNEL - Ldn = 0.674907

Coleman Rd Thursday, 6/2/16

			Penalization	
			10 dBA (Ldn)	5 dBA (CNEL)
TIME	dBA	micro pascals	micro pascals	micro pascals
0 / 24	50.5	111229	1112290	351737
100	47.6	57091	570910	180538
200	45.2	33467	334671	105832
300	43.4	21655	216552	68480
400	46.8	48232	482320	152523
500	52.6	180132	1801319	569627
600	58.0	625048	6250478	1976575
700	62.8	1889908	18899084	5976415
800	63.2	2085789	20857895	6595846
900	61.6	1455820	14558200	4603707
1000	61.4	1390854	13908544	4398268
1100	61.7	1480428	14804282	4681525
1200	62.3	1694027	16940272	5356984
1300	62.3	1717651	17176511	5431690
1400	62.8	1914517	19145165	6054233
1500	63.0	1980466	19804665	6262785
1600	62.9	1967670	19676702	6222320
1700	63.6	2265921	22659214	7165473
1800	62.7	1843645	18436450	5830117
1900	61.6	1430228	14302275	4522777
2000	60.6	1142804	11428040	3613863
2100	59.8	947907	9479072	2997546
2200	57.4	553192	5531919	1749346
2300	53.8	241160	2411602	762615

Low 61.432817
High 63.552448

Leq Daytime 8:00 am-5:00 p.m.
62.4 dBA

Leq Daytime 7:00 am-7:00 p.m.
62.6 dBA

Leq 24-Hour
60.5 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
62.6 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
63.3 dBA **and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.**

CNEL - Ldn = 0.6942562

Appendix G
Response to Comments



APPENDIX G

Public Comments and Responses on the Draft EIR

G.1 Purpose of the Response to Comments

This Response to Comments appendix provides responses to comments received on the draft Almaden Lake Improvement Project Environmental Impact Report (EIR). The Draft EIR identified the environmental consequences associated with the implementation of the Almaden Lake Improvement Project features, as well as mitigation measures to reduce significant and potentially significant impacts. As a result of these comments, the Draft EIR has been revised.

The Draft EIR with updates, together with this Response to Comments appendix, constitute the Final EIR for the proposed Almaden Lake Improvement Project.

The Final EIR is an informational document prepared by the lead agencies that must be considered by decision-makers before approving or denying a proposed project.

CEQA Guidelines (Section 15132) specify that a Final EIR shall consist of:

(a) The Draft EIR or a revision of the draft

(b) Comments and recommendation received on the Draft Program EIR, either verbatim or in summary

(c) A list of persons, organizations, and public agencies commenting on the Draft Program EIR

(d) The response of the lead agency to significant environmental points raised in the review and consultation process

(e) Any other information added by the lead agency.

G.2 Report Organization

Section G.4, *Individual Comments and Responses*, of this appendix contains the content of comment letters received during the comment period, and the lead agencies' responses to those comments. Each comment letter (included in full in Attachments G-1 through G-3) is coded in the margin of the comment letter, based on the initials assigned for each letter and the order of the comments received (see **Table G-1**). For example, the first comment is a

letter from the National Marine Fisheries Services (NMFS) and is coded F-001-NMFS. Comment codes beginning with F identify comments submitted by federal agencies, codes beginning with S are for comments submitted by state agencies, codes beginning with O are for comments submitted by organizations, and codes beginning with I are for comments submitted by individuals or groups of individuals. No comments were submitted by local agencies.

A number of comments that were received addressed similar concerns. Responses to these comments were consolidated into master responses and are provided in Section G.4, *Master Responses*. Two master responses were prepared in response to issues that elicited numerous comments. These master responses include:

- Consideration of Additional CEQA Alternative; and
- Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat

Where a response includes a change to the text of the Draft EIR, the text has been revised in the EIR. Minor text revisions are presented in the responses to comments; where substantial revisions were made, the responses include a reference to the revised text in the Final EIR. Text changes in this Response to Comments appendix are indented and shown in underline and ~~strikeout~~ format. Text shown in underline format is new text added to the Final Integrated Document. Text shown in ~~strikeout~~ format is text deleted from the document. Indented text that is presented in normal format (no underline or strikeout) is original text excerpted from the Draft EIR that will remain in the Final EIR and is shown to provide context for the revisions.

Table G-1 lists all persons and organizations that submitted comments on the Draft EIR during the comment period, the code used to identify each written communication (letter, e-mail, or comment card), and the date of written communication.

TABLE G-1
PERSONS AND ORGANIZATIONS THAT SUBMITTED COMMENTS ON THE DRAFT EIR

Code	Agency/Organization	Commenter	Date
1 F-001-NMFS	National Marine Fisheries Services	Gary Stern	4/04/2020
2 S-001-CDFW	Department of Fish and Wildlife	Gregg Erickson	2/4/2020
2 S-002-GCRCD	Guadalupe-Coyote Resource Conservation District	Stephanie Moreno	1/27/2020
2 S-003-RWQCB	San Francisco Bay Regional Water Quality Control Board	Nicole Fairley	2/4/2020
3 O-001-Caltrout.SFB	California Trout and San Francisco Baykeeper	Patrick Samuel	1/31/2020
3 O-002-CCCR	Citizens Committee to Complete the Refuge	Eileen McLaughlin	1/27/2020
3 O-003-SSRG	Salmon and Steelhead Restoration	Roger Castillo	1/27/2020
3 O-004-SCCCC	Santa Clara Creeks Coalition	Richard McMurtry	12/22/2019
3 O-005-SCLP.SCVAS	Sierra Club Loma Prieta Chapter	Katja Irvin	1/27/2020
4 I-001-Anonymous			1/08/2020
4 I-002-Armstrong_1		Dave Armstrong	1/08/2020
4 I-003-Armstrong_2		Dave Armstrong	1/08/2020
4 I-004-Barry		Deborah Barry	1/26/2020
4 I-005-Bernard		William Bernard	undated
4 I-006 Brock		Helen Brock	1/08/2020
4 I-007-Conaway		Steve Conaway	1/08/2020
4 I-008-Copeland		Ray Copeland	1/07/2020
4 I-009-Daniels		Jeff Daniels	1/08/2020
4 I-010-Demroff_1		Howard Demroff	1/07/2020
4 I-011-Demroff_2		Howard Demroff	1/08/2020
4 I-012-Dohmen		Brenda Dohmen	1/26/2020
4 I-013-Ferree		Stephen Ferree	1/08/2020
4 I-014-Frommer_Boyer		J.B. Frommer_Boyer	1/04/2020
I-015-Klaus		Edward Klaus	1/07/2020
4 I-016-Koopman		Greg Koopman	1/08/2020
4 I-017-Kuhl_1		Jim Kuhl	1/26/2020
4 I-018-Kuhl_2		Jim Kuhl	1/26/2020
4 I-019-Lang		Jennifer Lang	1/04/2020
4 I-020-Miller		John Miller	1/06/2020
4 I-021-Padilla		Edna Padilla	1/08/2020
4 I-022 Pagan		Steven Pagan	1/08/2020
4 I-023-Roldan		Marie Roldan	1/22/2020
4 I-024 Romero_1		Gavin Romero	1/08/2020
4 I-025 Romero_2		Tristan Romero	1/08/2020
4 I-026-Smith		Michelle Smith	12/28/2020
4 I-027-Tran		Susan Tran	1/06/2020
4 I-028-Troyan		Bernadette Troyan	1/08/2020
4 I-029-Watt_1		Jeff Watt	1/08/2020
4 I-030-Watt_2		Jeff Watt	1/10/2020
4 I-031-Watt_3		Jeff Watt	1/15/2020
4 I-032 Watt_4		Jeff Watt	1/26/2020
4 I-033-White		Marshall White	12/28/2020

G.3 Master Responses Individual Comments and Responses

G.3.1 Consideration of Additional CEQA Alternative

Many commenters suggested that the District conduct a more detailed analysis of an additional alternative to the proposed Almaden Lake Project. Specifically, commenters requested that a concept presented in EIR Section 4.D, Alternatives Considered but Rejected from Further Analysis, be analyzed as a CEQA alternative. This concept, Option 8, Expanded Creek Restoration, would remove or modify the Alamitos Diversion Dam and drop structure downstream of the Project area to allow restoration of this reach of Guadalupe River, prevent the backwater effect when the flashboard dam is in place, and further improve fish and riparian habitat.

As stated on EIR page 4-1, CEQA Guidelines Section 15126.6(a) states that an Environmental Impact Report (EIR) must describe and evaluate a reasonable range of alternatives to the Project that would feasibly attain most of the project's basic objectives and would avoid or substantially lessen any identified significant adverse environmental effects of the project. As stated on EIR page 4-2, the alternatives selection process considered multiple alternatives by the District. Certain alternatives were eliminated from consideration based on their inability to meet most of the Project's basic objectives, their infeasibility, or their inability to reduce the Project's environmental impacts.

CEQA Guidelines Section 15364 defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." CEQA Guidelines Section 15126.6(f)(1) states that "the factors that may be taken into account when addressing the potential feasibility of alternatives include site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (or the site is already owned by the proponent)."

As noted, the alternatives selection process considered multiple alternative options among those identified during the early planning process and from agency and public input, including Option 8, Expanded Creek Restoration. As background, the expanded creek restoration concept was originally proposed by the National Marine Fisheries Service (NMFS) in response to the Notice of Preparation issued for the Project in 2014. Others, including the Sierra Club and the South Bay Clean Creeks Coalition, made similar requests to the Board of Directors that were not accepted as part of the Fiscal Year 2015-16 Capital Improvement Program (CIP) process. Without allocated budget, Option 8 would increase costs substantially. In addition, the Alamitos Diversion Dam provides essential groundwater recharge as part of the District's water supply system.

As stated on EIR page 2-7, the Project purpose is to restore Alamitos Creek's function within the footprint of Almaden Lake Park in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint, and minimizing impacts to existing recreational features within the Park.

This purpose would be accomplished through the following objectives:

- Separate Alamitos Creek from Almaden Lake.
- Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives.[1]
- Remove potential lake entrainment of anadromous fish.
- Improve temperature conditions and reduce predation for native fish.
- Minimize impacts to existing recreational features.

The Project as proposed would accomplish the Project objectives. Regarding the three objectives specific to fisheries benefits, separating Alamitos Creek from Almaden Lake would separate native anadromous fish from predatory species found in the lake; eliminate the lake as a warming source within the project footprint and to downstream reaches; and remove entrainment impacts within the lake by providing a direct path for migrating fish to access upstream habitats. While Option 8 would also meet the Project objectives, expanding the Project footprint to include the Alamitos Diversion Dam and replacing the structure is not needed to meet the Project objectives. While Option 8 could provide additional enhancement benefits to fish habitat, it would not reduce the Project's significant impacts, and in fact would result in more adverse impacts than the Project, as further discussed below. Lead agencies may properly eliminate from further consideration potential alternatives that are incapable of reducing a project's significant environmental impacts. See, e.g., *In re Bay-Delta*, 43 Cal.4th (2008) 43 Cal.4th 1143 1167–1168 (EIR need not consider alternative that addressed preexisting problems that were part of baseline, but did not address adverse environmental impacts of proposed project).

Option 8 was considered but rejected from further consideration in the Draft EIR because it does not decrease any of the significant environmental impacts of the Project, and increases construction impacts beyond those caused by the Project. As stated on pages 4-44 and 4-45 of the EIR:

> "The purpose of the Project is to restore Alamitos Creek's stream function within the footprint of Almaden Lake in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint. By adopting a larger Project area with a doubled length of Alamitos Creek, this option would improve more anadromous fish habitat than the Project. However, this option would expand the Project outside of the footprint of Almaden Lake. Although this option would be beneficial to native anadromous fish and its related habitat, Option 8 would be infeasible because it would be prohibitively expensive, and beyond the

[1] Water quality objectives are discussed in Section 3K, Hydrology.

> budget provided by the District's Board in the 2015-2016 Capital Improvement Program (CIP).
>
> Option 8 also would not decrease any of the significant effects of the Project. This option would include all of the elements of the Project, and would therefore include all of the significant environmental impacts of the Project. Because Option 8 would expand the Project footprint to include the area between the lake and the Alamitos Diversion Dam, this option would have more extensive construction-related impacts than would occur under the Project. In addition, the area periodically inundated by the operation of the Alamitos Flashboard Dam, including the Alamitos Percolation Pond, are potentially jurisdictional waters of the U.S. Ceasing the operation of the Alamitos Flashboard Dam as proposed under this option could reduce the size and extent of these potentially jurisdictional waters."

As further discussion beyond that disclosed in the EIR, an expanded Project footprint that includes the Project as proposed, in addition to an extensive segment of the creek downstream, would cause increased construction-related impacts, including additional dust generation, air pollutant emissions, greenhouse gas emissions, energy use, noise, and truck trips from the additional construction equipment needed for grading and hauling; aesthetic impacts to the channel; and impacts to nesting birds, trees, and unknown cultural resources. Eliminating the ponded area above the diversion dam under Option 8 would also reduce the volume of groundwater recharged in-stream, as water impounded by the flashboard dam percolates into underlying aquifers and is considered part of the District's managed recharge program. Eliminating the diversion dam would also require a new diversion structure to supply local water to the Alamitos Percolation Pond, which would generate additional construction and operational environmental impacts.

It is noted that modifying the creek between the Lake to the Alamitos Diversion Dam could address specific baseline conditions associated with the operation of the structure. However, an EIR does not need to consider an alternative that addresses preexisting problems that are part of the baseline, but does not reduce or avoid the significant environmental impacts of the Project. Option 8 is essentially a different, more expanded project, with different, more expanded objectives. However, under CEQA, the District has considerable discretion to identify and pursue a particular project designed to meet a particular set of objectives. California Oak Foundation v. Regents of University of California (2010) 188 Cal.App. 4th 227,276.

An additional, independent reason for rejecting Option 8 from detailed consideration, as discussed on EIR p. 4-45, is that Option 8 is considered infeasible because it would be prohibitively expensive, and substantially beyond the estimated budget for the Project included in the Fiscal Year 2015-16 CIP, which is a projection of capital funding requirements for District planned capital projects. As noted above, requests to expand the proposed Project scope and estimated budget were made to the Board of Directors as part of the Fiscal Year 2015-16 CIP process. However, the Board did not accept these requests.

The approved Project budget estimate does not extend the Project downstream of the Lake. Although no cost estimates have been prepared for removing the drop structure and restoring Guadalupe River, the costs would be substantial. The effort would include planning

and design for removal of existing infrastructure (dam with fish ladder, groundwater percolation pond pipes with appurtenances), and restoration of the channel, an application for water rights amendment to the State Water Resources Control Board, planning and design of an alternate diversion structure to provide water to the Alamitos and Guadalupe[2] Percolation Ponds, and construction and monitoring of all elements.

Should the District decide to pursue a project downstream of the Lake in the future, it could be planned and developed as a separate project with separate project objectives, undergoing its own CEQA review. The proposed Almaden Lake Improvement Project is designed in a way that would not preclude implementation of a future project addressing the Alamitos Diversion Dam. The Project does not rely on operation of the diversion dam to meet its objectives, and implementation of the Project would not preclude potential actions that could be proposed for the diversion dam.

In summary, Option 8 was considered as an alternative in the EIR, but rejected from further consideration because:

- It does not reduce significant environmental effects of the Project as required for an alternative under CEQA;
- It increases construction related impacts beyond those of the Project;
- It decreases in-stream groundwater recharge behind the diversion dam in the Guadalupe River and requires modifying water supply inputs and infrastructure to the Alamitos Percolation Pond, thereby reducing District water supplies; and
- It is considered infeasible because it substantially expands beyond the budget for the Project provided by the District's Board.

G.3.2 Consideration of Project Ability to Meet Fisheries-related Objectives

Many commenters requested information regarding the ability of the Project, based on the 30 percent design information presented in the EIR Project Description (Chapter 2) for the restoration of Alamitos Creek within the Almaden Lake footprint, to meet the fishery objectives of the Project. Commenters suggested that approximately two-thirds of the restored low-flow channel could be influenced by the operation of the existing Alamitos Diversion Dam downstream. Commenters note that when the seasonal flashboard dam is in place, water could back up to the dam's maximum operational level of 192-foot (above mean sea level) elevation, which includes more than half the channel in the Project footprint. Commenters assert that backwater conditions can support non-native predatory fish, reduce water velocities that thereby increase water retention time and warm stream water, and reduce the habitat benefits of restored riffles.

[2] The Alamitos Percolation Pond is the sole source of water to the Guadalupe Percolation Ponds.

In response to the comment that, with the dam in place, water would back up to the 192-foot elevation, the EIR has been revised to clarify that of the approximately 1,800 linear feet (0.32 miles) of creek section proposed for restoration, up to approximately 1,300 ~~only about 200~~ linear feet of the new channel could remain as an impoundment when the flashboard dam is in place between April and December, which is generally outside of the migration periods of native anadromous fish, and operated at its maximum level. See Chapter 2, Project Description, 'Reduced Predation'. Even if the effects asserted in these comments may occur, they would not affect the adequacy of the EIR's analysis of the Project's adverse environmental impacts, or represent new adverse environmental impacts of the Project as compared to existing conditions, with the existing Almaden Lake imposing entrainment and predation effects to steelhead by disrupting its migratory passage through the footprint of the lake. Rather the comments address how effective the Project would be in achieving the Project purpose and objectives related to fishery habitat.

Prior to and in response to these comments, the District re-evaluated hydrology and hydraulic analyses to determine if the extent of backwater from the dam could be reduced in the Project footprint. Options for this are limited since the Project must align with the upstream Alamitos Creek channel elevation, and the restored channel gradient and morphology are intended to facilitate fish passage during the primary fish migration periods, when the seasonal flashboard dam is not in place. A potential option to reduce the upstream extent of inundation when the dam is fully operational was to introduce more of a step-pool morphology to the restored channel, but hydraulic analyses determined that this would impede passage conditions when the dam is not in place. This step-pool morphology would also require significant re-design and re-construction if a project at the diversion dam is undertaken in the future.

As stated on EIR page 2-7 of the Project Description, the Project purpose with respect to fisheries is to restore Alamitos Creek's function within the footprint of Almaden Lake Park to improve physical habitat for steelhead and other anadromous fish. Specific Project objectives to achieve this purpose include:

- Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives.
- Remove potential lake entrainment of anadromous fish.
- Improve temperature conditions and reduce predation for native fish.

The Project as proposed would accomplish the fisheries-related objectives even with the flashboard dam creating backwater effects into the restored channel. Separating Alamitos Creek from Almaden Lake would separate native anadromous fish from predatory species found in the lake; eliminate the lake as a warming and methylmercury source within the Project footprint and to downstream reaches; and remove entrainment impacts within the lake by providing a direct path for migrating fish to access upstream habitats. As noted on EIR page 2-12, a Project goal is for a sustainable geomorphic design that facilitates fish passage, similar to the Alamitos Creek channel section

immediately upstream of the Project area. The Project as proposed and analyzed in the EIR achieves this geomorphic goal and the fisheries objectives.

Some backwater effects from the diversion dam could be positive for fisheries and the creek's aquatic, wetland, riparian, and shaded riverine aquatic habitats through slightly increased water depths and duration, magnitude, and frequency of floodplain inundation during the summer and fall months when the dam is in place. These hydrologic drivers are the essential water supply to aquatic, wetland, and riparian habitats, supporting the creek's fisheries and other resources. The benefits of access to natural floodplains, wetlands, and vegetated banks by salmonids and other fisheries are well-documented. The diversion dam may provide more water and water further into the growing season, increasing the health and vigor of the creek corridor's vegetation, and how much of the year fish can utilize the habitats.

G.4 Individual Comments and Responses

Public comments and the responses to those comments are presented in this section.

ID	Issue Text	Response Text
F-001-NMFS-1	NOAA's National Marine Fisheries Service (NMFS) supports the project's objectives to separate Alamitos Creek from Almaden Lake, reduce production of methylmercury, remove potential lake entrainment of anadromous fish, improve water temperature conditions, reduce predation of native fish, and minimize impacts to existing recreational features. However, we are concerned that the proposed project will not fully achieve the fisheries-related objectives due to the DEIR's assumed water surface elevation associated with the seasonal operation of the flashboards at the Alamitos Diversion Dam.	The District appreciates the NMFS' support for the Project's objectives. As stated on page 2-7 of the Project Description, the objectives of the Almaden Lake Improvement Project (Project) with respect to fisheries include: • Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives. • Remove potential lake entrainment of anadromous fish. • Improve temperature conditions and reduce predation for native fish. The Project would fully accomplish these objectives by separating Alamitos Creek from Almaden Lake by constructing a levee, re-contouring the remaining lake bottom and capping it with clean fill, and establishing appropriate native vegetation along the banks and floodplain of the restored Alamitos Creek channel. The Environmental Impact Report EIR includes a summary of fisheries benefits, including improved anadromous fish passage, improved riverine habitat, reduced predation, reduced water temperature, reduced mercury methylation, and improved ecosystem function (EIR pages 2-24 and 2-25). As to the concern raised by NMFS and others about the operation of the Alamitos dam structure and how it affects the Project's ability to meet the Project objectives, see the Master Response above (Section G.3.2, Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat).
F-001-NMFS-2	Additionally, the DEIR's basis for rejection of Option 8 – Expanded Creek Restoration is not well supported, and we believe Option 8 should be pursued as a full project alternative. An alternative that addresses the channel from the upstream end of Almaden Lake to the Alamitos Diversion Dam (i.e., Option 8) is considerably more likely to achieve the fisheries objectives than the proposed action. Our comments below provide additional information regarding our concerns.	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project. Further, the Project fully accomplishes the objectives established for the Project, as discussed in response to F-001-NMFS-1.
F-001-NMFS-3	Chapter 2 of the DEIR highlights multiple benefits to anadromous fish, including federally-threatened Central California Coast steelhead (Oncorhynchus mykiss). Benefits attributed to the proposed project include improved water temperatures for salmonids, reduced predation from non-native species, improved sediment transport, creation of a riffle-pool-run pattern for improved fish habitat, and establishment of native riparian vegetation on the banks to create shade for Alamitos Creek. These fisheries benefits would likely accrue over the full 1,800-foot length of the restored channel reach if the project area was not subjected to seasonal inundation by operation of the Alamitos Diversion Dam. Installation of the flashboards at the Alamitos Diversion Dam raises the elevation of the water surface by approximately 5 feet and this backwater effect extends into the proposed restored reach of Alamitos Creek. However, the DEIR inaccurately states that "… only about 200 linear feet would remain as an impoundment when the flashboard dam is in place…" (see DEIR page 2-24). In fact, the project's 30% design drawings show the backwater effects of the flashboards raise the water surface to an elevation of 192 feet, which comprises approximately 1,200 linear feet of the project's 1,800 feet of restored channel (67% of the entire reach). With the flashboard dam operated by Valley Water from April to December, the majority of the restored length of Alamitos Creek will be subject to pond-like conditions with low water velocities for approximately 9 months of every year.	Please see the Master Response above (Section G.3.2, Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat) for a discussion of why these comments do not affect the adequacy of the EIR's analysis of the Project's adverse environmental impacts or present new adverse environmental impacts caused by the Project. When the flashboard dam is in place between April and December, which is generally outside of the migration periods of native anadromous fish a majority of the restored channel would be inundated by backwater from the flashboard dam. At times when the flashboard dam is not in place, typically during migration periods, the restored creek section would function as continuous riverine habitat.

ID	Issue Text	Response Text
F-001-NMFS-4	Riffle-Pool-Run Channel Design. With the backwater effects of the Alamitos Diversion Dam extending a significant distance upstream, the project's geomorphic restoration of the creek's streambed into riffle-pool-run sequences will only be partially effective. Riffles are particularly important for steelhead as they create ideal habitat for food production, surface turbidity for fish cover, protruding rocks for hydraulic complexity, and clean gravels for spawning. Riffles, as defined by the California Salmonid Stream Habitat Restoration Manual (Flosi et al., 2012), are shallow to moderately deep reaches with swiftly flowing, turbulent water and some partially exposed substrate. Although the project's restored streambed design includes riffles, runs and pools, when the Alamitos Diversion Dam is operated from April through December, two-thirds of the restored riffles will be flooded and no longer provide the habitat benefits described above. In addition, the lowermost 1,200 linear feet of the restored reach will return to ponded conditions which favor non-native predatory fish. Ponded conditions will also reduce water velocities, thereby increasing water retention time and subsequently having a warming influence on stream temperatures. Banks and lower floodplain areas planted with native riparian vegetation will be less effective in providing the benefits of shaded riverine conditions when backwatered by operation of the flashboards at Alamitos Diversion Dam. The DEIR does not acknowledge these limits to the project's potential fisheries benefits.	Please see the Master Response above (Section G.3.2, Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat) for a discussion of why these comments do not affect the adequacy of the EIR's analysis of the Project's adverse environmental impacts or present new adverse environmental impacts caused by the Project. The flashboard dam is typically removed during steelhead migration season. When the flashboard dam is in place a portion of the restored channel would be in ponded conditions. Even if the effects asserted in these comments may occur, they would not affect the adequacy of the EIR's analysis of the Project's adverse environmental impacts or represent new adverse environmental impacts of the Project as compared to existing conditions, with the existing Almaden Lake imposing entrainment and predation effects to steelhead by disrupting its migratory passage through the footprint of the lake. As noted in the Master Response, some backwater effects could be positive for fisheries and riparian habitat.
F-001-NMFS-5	Spawning Gravels. Within the DEIR's Summary of Fisheries Benefits on page 2-24, there is discussion of the project's development of aquatic habitat features for native fish including the deposition of spawning gravels in the restored channel of Alamitos Creek. Monitoring data from the Masson Fishway on Guadalupe Creek suggests late-February and early March are the peak migration months for adult steelhead in the Guadalupe watershed (SCVWD, 2009). When the Alamitos Diversion Dam's flashboards are removed during the winter months, riffles and runs within the restored reach of Alamitos Creek may provide suitable conditions for steelhead spawning. Steelhead eggs hatch into "alevins" after an incubation period of approximately 25-35 days depending on water temperature (Shapovalov & Taft 1954). Alevins remain in the gravel for an additional two to three weeks until they emerge as young juveniles known as "fry". This timing indicates a high probability that unhatched steelhead eggs and alevins will still be in their redds when the flashboards are installed. If adult steelhead do select sites for spawning within the restored reach of the Alamitos Creek channel, the resulting ponded water conditions are unlikely to provide sufficient flow velocity to maintain circulation through their gravel redds, as a clean, well-oxygenated environment is required by alevins and incubating eggs. Therefore, this project may attract steelhead to spawn in areas that become unsuitable for egg and alevin survival when the Alamitos Diversion Dam is operated, and result in the incidental take of threatened CCC steelhead.	Please see the Master Response above (Section G.3.2, Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat) for a discussion of why these comments do not affect the adequacy of the EIR's analysis of the Project's adverse environmental impacts or present new adverse environmental impacts caused by the Project. Although the Project could improve habitat conditions in the restored channel as discussed in the Summary of Fisheries Benefits, the site is relatively low in the watershed and not as likely to attract spawning steelhead as areas that would be made easier to access upstream.
F-001-NMFS-6	Almaden Valley Pipeline Water Source. A significant fisheries benefit not presented in the DEIR pertains to the project's development of a new source of water supply for the Los Alamitos Percolation Pond. The proposed flow-through water management system for Almaden Lake uses imported water from the Almaden Valley Pipeline and would supply 5.0 to 7.5 cfs to the Los Alamitos Percolation Pond. The current source	The comment is correct that imported water would be used to fill Almaden Lake and then be circulated to the Alamitos Percolation Pond/Los Capitancillos Percolation Ponds for groundwater recharge. It would be undesirable to fully replace local water used for groundwater recharge at Alamitos Pond with imported water as this would not be consistent with state policy[3] calling for a reduction in the reliance of water

[3] The Delta Reform Act of 2009 established that it is state policy to "reduce reliance" on the Delta in meeting the state's future water supply needs

ID	Issue Text	Response Text
	of water for the percolation pond is limited to the existing gravity-fed intake, equipped with a 12 cfs fish screen, that operates when the flashboards at the Alamitos Diversion Dam are installed. This additional source of imported water could significantly reduce the amount of water diverted from the Guadalupe River for Los Alamitos Percolation Pond. Reduced diversion rates would allow more streamflow to pass downstream in the Guadalupe River, resulting in improved habitat conditions for spawning and rearing native fish, including anadromous salmonids. This potential fisheries benefit of the project should be presented in the document.	source from the Sacramento-San Joaquin Delta. The Alamitos pond would continue to use local water diverted from Guadalupe River to exercise the District's water right at this location, which is an important part of the County's overall water supply. Imported water to Alamitos Pond may be offset by a reduction in imported water which is delivered to Calero Reservoir and/or Alamitos Creek upstream of the Project site and used for in-stream recharge. A combination of imported and local water would still be provided to the creek to meet minimum flow requirements in Guadalupe River at the drop structure and downstream consistent with Lake and Streambed Alteration Agreements with the California Department of Fish and Wildlife.
F-001-NMFS-7	The proposed project would restore approximately 1,800 feet of Alamitos Creek upstream of the Coleman Road Bridge, and as presented above, approximately 1,200 linear feet of the restored channel will be backwatered during operation of the Alamitos Diversion Dam. This ponded condition created by operation of the flashboards also extends approximately 1,700 feet downstream of the Coleman Road Bridge to the dam. In total, the Alamitos Diversion Dam creates pond-like conditions for a contiguous distance of approximately 2,900 linear feet encompassing lower Alamitos Creek, the Guadalupe Creek confluence, and the upper Guadalupe River. Although the proposed project seeks to address adverse effects on fish habitat and sediment transport by separating the creek from the lake, the project's effectiveness will be severely constrained by not addressing the backwatered condition created by the Alamitos Diversion Dam. Non-native predatory fish are likely to continue to thrive in this reach during the 9-month period the flashboards are in place. Thermal warming of streamflows will continue through the long and unshaded reaches of open water. Sediment transport may improve in Alamitos Creek, but will not reconnect the sediment supply to the Guadalupe River. The project's sediment transport analysis concludes sediment will move through the restored reach of Alamitos Creek and then drop into the pool immediately downstream of Coleman Avenue (Xu 2017). Expanded Creek Restoration. During scoping for the project's DEIR in 2014, NMFS requested Valley Water develop an alternative that looks more broadly at the habitat problems for native fish at the confluence of Alamitos and Guadalupe Creeks, and evaluate potential solutions that would include the reach below the Coleman Road Bridge. Recognizing that the effects of the Alamitos Diversion Dam extend upstream into the footprint of the Almaden Lake project, NMFS requested evaluation of the benefits of replacing the flashboard dam with an alternative water diversion method for supplying the Los Alamitos Percolation Pond. Removal of the Alamitos Diversion Dam would eliminate the seasonally ponded condition in the proposed project restoration reach (approximately 1,800 linear feet) and the 1,700-foot long reach below Coleman Road. Full geomorphic restoration could be performed for a distance of approximately 3,500 feet with riffle-pool-run sequences that provide steelhead spawning, rearing, holding, and unimpeded migration habitat. This restoration would eliminate habitat for non-native predatory fish. Additionally, riparian vegetation could establish along the banks and within low floodplain areas, which would reduce thermal warming of the stream and increase beneficial allochthonous input. Furthermore, sediment transport would be restored throughout the entire reach and likely eliminate the need for annual sediment removal from Guadalupe Creek at the Almaden Expressway, minimizing future maintenance costs. By reconnecting the sediment supply from Alamitos and Guadalupe Creeks to the Guadalupe River,	The District recognizes that though additional ecological benefits could be gained by expanding the project to include restoration of the drop structure such as suggested by the comment, such an expansion would come with considerably greater cost and complexity. Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project. Please see the Master Response above (Section G.3.2, Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat) for why these comments do not affect the adequacy of the EIR's analysis of the Project's adverse environmental impacts or present new adverse environmental impacts caused by the Project. Although non-native predatory fish would not likely be eliminated through implementation of the Project, disconnecting Almaden Lake from Alamitos Creek under the Project, coupled with the existing practice of removing the flashboard dam for four months per year, would reduce available habitat for these fish and reduce the total population. The Project is designed to have a stable channel that effectively moves sediment through the Project area, and much of this sediment may drop in a pool downstream of Coleman Avenue until it is filled and removed under the Stream Maintenance Program, as currently occurs.

ID	Issue Text	Response Text
	coarse sediment naturally routed downstream will replenish spawning gravels for anadromous fish. Additional fisheries benefits that would accrue with removal of the Alamitos Diversion Dam include the following: • Although the existing Alamitos fish ladder successfully passes anadromous salmonids upstream and downstream, fish ladders create migration delays and regular maintenance is required. Removal of the diversion dam would allow for removal of the fish ladder. • During moderate and high streamflow events (in excess of the 50 cfs capacity of the fish ladder), water and fish spill over the concrete diversion dam. With this spill at the dam, threatened CCC steelhead and Chinook salmon are likely injured or killed when they strike the energy dissipation structures at the base of the dam. • The existing Los Alamitos Percolation Pond water intake (equipped with a 12 cfs capacity fish screen) could be eliminated with the construction of a pump station or an engineered infiltration gallery installed under the stream channel. The new pump station or infiltration gallery could be downsized from 12 cfs because Valley Water proposes to develop a new source of water to circulate through Almaden Lake (i.e., imported water at a rate of 5 cfs from October through April, and 7.5 cfs from May through September) which would be discharged to the Los Alamitos Percolation Pond. Option 8 not only meets all of the project objectives, it is a far superior approach because it eliminates the adverse effects associated with the diversion dam and seasonal ponded water conditions over a distance of 0.65 mile. Option 8 can remedy the problems and fully achieve the project's objectives associated with lake entrainment of anadromous fish, thermal warming, predation by non-native fish, creation of riverine habitat, and restoration of sediment transport. This broader approach aligns with the "One Water Plan" vision to "… manage Santa Clara County water resources holistically and sustainably to benefit people and the environment in a way that is informed by community values."	
F-001-NMFS-8	Fisheries and Aquatic Habitat Collaborative Effort. In 2003, Resource agency and Valley Water representatives recognized the importance of looking at lower Alamitos Creek, lower Guadalupe Creek, and the upper Guadalupe River on a reach scale and incorporated section 6.6.2.1.3.3(B) into the draft Settlement Agreement for the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE). This provision in the FAHCE Settlement Agreement requires the development of a plan "… to isolate Alamitos Creek and Guadalupe Creek, and to screen flow entering Almaden Lake to prevent entrainment and impingement of steelhead trout and salmon." Guadalupe Creek was specifically included to ensure the plan addresses the entire reach affected by impoundment at the Alamitos Diversion Dam. By excluding the reach below Coleman Road Bridge, the proposed project does not meet the requirements of this provision nor the intent of those who drafted the Settlement Agreement.	The Almaden Lake Project, as proposed, would meet the Project objectives as stated in the Draft EIR. Implementation of the FAHCE Settlement Agreement is not an objective of the Almaden Lake Project, and the FAHCE Settlement Agreement is being implemented through a different process. However, the Project does help meet the plainly-stated objective of FAHCE Settlement Agreement section 6.6.2.1.3.3(B), which calls for completion of an "Alamitos Creek Facilities Plan" which will "evaluate alternatives, including a bypass channel, to isolate Almaden Lake from Alamitos Creek and Guadalupe Creek" and if a feasible alternative exists, "the plan will recommend action, including design and construction schedules. This Project effectively isolates Almaden Lake from Alamitos Creek and Guadalupe Creek. For these reasons, the District disagrees with the commenter's statement that "[b]y excluding the reach below Coleman Road Bridge, the proposed project does not meet the requirements of this provision…." In addition, section 6.6.2.1.1(A) of the Settlement Agreement calls for remediation of barriers to fish passage at the Alamitos Drop Structure, which the District believes was accomplished when it constructed a screened diversion and fish ladder. The effectiveness of the screened diversion and fish ladder has been monitored and will continue to be as part of FAHCE's adaptive management program.

ID	Issue Text	Response Text
F-001-NMFS-9	The DEIR's project description describes the discharge of Almaden Lake overflow water via an outlet pipeline to Alamitos Creek during times when the Los Alamitos Percolation Pond is unavailable. One of the project's primary objectives is to remove the warming influence of Almaden Lake on the stream. This component of the proposed project appears to conflict with that objective since water warmed by Almaden Lake would periodically discharge to Alamitos Creek. The DEIR concludes in Table 3.K-2 that the Project's impacts on water quality standards or waste discharge requirements are less than significant with mitigation. We could not find discussion in the DEIR of the potential effects associated with the discharge of Almaden Lake overflow water to Alamitos Creek via the new outlet pipe. Thus, information to support a finding of less than significant with mitigation for the project's potential impacts on water quality (Table 3.K-2) is lacking from the DEIR. We recommend the project develop an alternative method to manage overflow water from Almaden Lake that does not require discharge to Alamitos Creek.	As stated in the Project Description (EIR page 2-16), the District plans to pump water from Almaden Lake to Alamitos Percolation Pond/Los Capitancillos Percolation Ponds, where it would be used for groundwater recharge. Operational discharges of Lake water to the creek (described on EIR page 2-19) would only be implemented when capacity at the Ponds is not available. If the ponds are not available, water would be retained in the Lake as long as possible, and would only be discharged to the Creek if Lake water quality begins to decline due to the lack of discharge. The lake discharge pump is designed to draw lake water from deeper levels, to minimize temperature differences between the lake and discharge location. Because creek discharges are not planned or intended, the District does not have information on anticipated frequency, duration, or flow rate. CEQA compares the impacts of the Project to the existing baseline condition. Section 15125(a) of the CEQA Guidelines states "This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." The DEIR in considering whether lake discharges to the creek would be significant, appropriately compared the existing condition baseline, in which there is no separation between the lake and the creek, to the future condition under the Project where lake water would be pumped to Alamitos Percolation Pond. Under the Project, occasional release of lake water into the creek would be an improvement over the current condition, and would not constitute a significant adverse impact pursuant to CEQA. Discharges of potentially warmer water would only occur occasionally, if needed at all, versus the current condition of a direct connection between the lake and creek.
F-001-NMFS-10	In summary, the proposed project is a large and important restoration effort for the Guadalupe River watershed with appropriate goals that support the recovery of threatened CCC steelhead. Almaden Lake has deleterious impacts on native fish, and in combination with the effects of the Alamitos Diversion Dam, this 0.65-mile-long reach of stream warrants our attention and requires restoration. However, by subjectively limiting the footprint of the proposed project to the reach upstream of Coleman Road Bridge, Valley Water is missing a unique opportunity to apply an ecological restoration approach to long-standing habitat problems. By reconnecting Alamitos Creek and Guadalupe Creek to the upper Guadalupe River, natural processes (i.e., sediment routing), habitat connectivity (i.e., fish passage, spawning and rearing), water quality (i.e., stream temperature), and the riparian corridor can be effectively restored to reach its full potential. We urge Valley Water to reconsider Option 8 as it would comprehensively accomplish the project's objectives related to fisheries habitat improvement and stream restoration.	The District appreciates the NMFS' support for the Project. Although consideration of a potential action for the drop structure is not being included as part of the Almaden Lake Improvement Project, the Project would not preclude or limit future action at the drop structure, as discussed in the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative). This Master Response also explains why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project.

ID	Issue Text	Response Text
S-001-CDFW-1	Important details regarding future operations of the new lake facilities are not adequately described in the Project Description. CDFW recommends that additional information be provided and further assessment in Chapter 3 Environmental Setting, Impacts, and Mitigation be included. Key information that should be further described include water supply reliability to the new lake, frequency in which water from the new lake will be discharged to Alamitos Creek, and whether discharge will impact stream temperatures or seed stream with non-native predatory fish. Furthermore, the EIR should include an analysis of the continued operation of the Alamitos flashboard dam and how the operation is anticipated to affect steelhead and other native fish after the separation of Almaden Lake from Alamitos Creek. This assessment should include, but not be limited to, potential impacts to temperature, fish passage, and predation.	The Draft EIR Project Description provides a sufficient level of detail to disclose the Project's likely significant adverse impacts. A project description should not supply extensive detail beyond that needed for evaluation and review of the project's environmental impacts (CEQA Guidelines Section 15124). The reliability of future water supply to the lake is discussed in EIR Impact 3.P-1, which includes discussion of whether there is sufficient water supply available for the Project. As discussed, the supply would come from the District's existing water rights and would not require or result in the relocation or construction of new or expanded water facilities. During temporary periods when Almaden Valley Pipeline water would not be available for the lake flow-through water system, lake water levels would remain generally stable due to underlying lake bed soil impermeability. Please see the response to Comment F-001-NMFS-9 regarding discharge of lake water to the creek under the Project. Discharges to the creek would be avoided to the greatest extent feasible, but may be necessary at times. If necessary, water temperatures would likely be similar to existing conditions where the lake discharges directly to the creek. The lake discharge pump will be screened to minimize the passage of fish that may be in the lake and is designed to draw lake water from deeper levels, to minimize temperature differences between the lake and discharge location. The operation of the flashboard dam is an existing condition that is part of the baseline. CEQA does not require an evaluation of impacts from the baseline condition. The Draft EIR is focused on environmental effects caused by the Project.
S-001-CDFW-2	As previously mentioned, the preferred alternative would include a flow through system through Almaden Lake. The draft EIR states that horizontal directional drilling will occur to install a pipeline under Guadalupe Creek in order to pump water from the lake to the Pond. Impacts from this method were not clearly described in Chapter 3. This activity has the potential for "frac-out" (release of drilling fluid) into the creek, which would cause direct impacts to biological resources. The EIR should include a requirement for preparation of a frac-out plan, which would address all potential biological impacts and include a contingency plan with avoidance, minimization and mitigation measures in the event that a frac-out occurs. For the pipeline that will connect the AVP to the lake, CDFW recommends that the EIR include a more complete description of this system. The draft EIR states that water will be gravity fed into the lake, but it is unclear whether flow of waler will be controlled from the AVP to this new pipeline.	Please see the response to Comment S-003-RWQCB-8; also regarding use of horizontal directional drilling. As noted in response to that comment, the impacts of directional drilling in this location are discussed in the EIR, including Impacts 3.K-1 and 3.E-3, which discusses use and potential discharge of lubricants and other fluids, as well as potential for erosion and release of sediments or mud, and associated effects on riparian habitat. As discussed, the Project includes control measures that would prevent slurry water from entering waterways. The control measures would include training of construction personnel, methods for preventing accidental release (including maintaining pressure in the borehole and continuous monitoring of slurry volumes at the exit and entry pits), clean-up requirements, and notification requirements. Furthermore, the Project would be required to acquire coverage under the Construction General Permit. Conditions of the permit would require deployment of additional water quality pollutant minimization measures, including construction and equipment related BMPs, and stormwater management BMPs. Adherence to existing regulation and implementation of District BMPs would ensure that construction period water quality impacts would be minimized and would be less than significant, and that any potential water quality releases would not degrade beneficial use or interfere with implementation of the Basin Plan. The pipeline from the Almaden Valley Pipeline to the lake would be controlled with valves at the turnout to control the flow of water to the lake.
S-001-CDFW-3	The draft EIR states that fish relocation would occur by using an electrofishing boat, backpack electrofishing, and seines. CDFW recommends that as many native fish as feasible be captured and relocated. If steelhead smelts or steel head kelts are captured during the relocation effort, CDFW recommends placing them downstream	EIR Impact 3.E-1 addresses potential impacts to fish species during construction. As noted on EIR page 3.3-16, due to the nature and amount of in-water work required by the Project, construction activities, including fish relocation activities, could result in the accidental take of special-status native fish even with the proposed boat based

ID	Issue Text	Response Text
	in the Guadalupe River so they can migrate to San Francisco Bay. It may be preferable to put other species of native fish downstream as well, while steelhead parr and resident trout should be relocated upstream of the Project area. CDFW staff is available for coordination on the fish relocation plan prior to finalization of the EIR.	electrofishing and use of block nets. To minimize the severity of this impact, the District would implement Mitigation Measure 3.E-1 (Native Fish Capture and Relocation). This measure requires the preparation and implementation of a capture and relocation plan with specific components to minimize impacts to steelhead, salmon, and lamprey, should any be present, during electrofishing, capture and relocation. With this measure in place the risk of take of special status species would be minimized to a less than significant level with mitigation. Should the District decide to certify the EIR and approve the project, a Mitigation Monitoring and Reporting Program would be adopted as part of project approval. Following such approval, Mitigation Measure 3.E-1 would be implemented, and the District would seek CDFW staff input during preparation of the fish relocation plan. The plan can include specific measures regarding the location of release of captured native fish. The relocation of captured steelhead should be seasonally dependent. If smolt sized fish are captured and the dewatering is occurring during the summer months it might not be in the best interest of these fish to be moved downstream. No migration season will be altered by dewatering activities; if smolts are moved upstream in the summer they will still be able to out-migrate in the winter.
S-001-CDFW-4	The draft EIR does not adequately describe all construction phases of the preferred alternative. Pages 2-37 and 2-38 state that dewatering of Alamitos Creek and the existing Almaden Lake would occur between June 1 and October 15 by installing a series of sheet piles along the future levee site to prevent creek flow from entering Almaden Lake. A cofferdam and pumps would also be installed to divert water around the work area and would be discharged to Alamitos Creek downstream of the lake. Additional pumps would then be used to drain isolated ponded water from the existing lake. Page 2-44 states that the configuration of the new lake and island will occur in the first summer of construction, while construction of the new creek channel and floodplain would occur in the second year of construction. It is unclear how volitional passage of fish will occur through the Project site during the winter between construction in years 1 and 2. It is also unclear whether sheet pile walls are required and whether it would be less impactful to dewater the Project area as a whole. CDFW recommends that the EIR include additional information and a more detailed dewatering plan to address the comments above. The dewatering plan should also include a figure showing where cofferdams, pipelines, baker tanks, and other structures or equipment will be placed for the diversion. The EIR should also provide a more thorough description of Project sequencing; Table 2-2 should be revised to indicate time windows by month and year for each phase of the Project.	This comment does not raise any issues regarding adequacy of the EIR's analysis of the Project's adverse environmental impacts. The EIR Project Description includes conceptual design information available at this time, and in sufficient detail to analyze the likely environmental impacts of constructing and operating the proposed project. As discussed in EIR Chapter 2, Project Description, sheet piles would be used to isolate the lake reconfiguration area and the restored creek channel. The lakebed would be dried during this first phase, but the restored creek channel would remain wetted during the lake construction and throughout the first year of construction. This allows passage up and downstream for migrating steelhead. This is the preferred method to ensure passage is not blocked during the lake reconfiguration. During the second summer, flow would be diverted around the work area to allow restoration of Alamitos Creek to occur. The detailed dewatering plan requested in this comment would be developed if the project is approved and the project design is advanced further. A conceptual dewatering plan including cofferdam, pipelines, and other structures necessary for diversion would be provided as part of the application for a Lake and Streambed Alteration Agreement, and other permits. All the elements noted in the comment (cofferdams, pipelines, baker tanks, etc. would be located within the study area and staging areas identified on EIR Figure 1-1 and 1-2.
S-001-CDFW-5	An objective of the Project is to build a new Alamitos Creek channel and floodplain system in stable equilibrium. Page 2-46 states that with the preferred alternative Valley Water anticipates stream maintenance will be necessary, including removal of 5,000 cubic yards of sediment from the reconstructed floodplain and channel on a 10-year recurrence interval. CDFW believes that a channel requiring this level of maintenance is unlikely to provide the benefits stated in the draft EIR. With a new 11-acre floodplain, CDFW recommends that Valley Water strive to design a system capable of containing the 100-year flow and that will also allow for anticipated levels of sediment flux and aggradation. A detailed hydraulic model for the Project should be developed that is capable of reasonably predicting sediment dynamics that will be observed in the restored stream channel and floodplain. As part of the restoration	This comment does not raise any issues regarding adequacy of the EIR's analysis of the Project's adverse environmental impacts. As described in Impact 3.K-1, the restored creek channel would be designed to have a stable geomorphic channel with a riffle-pool-run pattern, designed to neither aggrade nor degrade for the entire length of the restored creek section. Channel design would be informed by two technical analyses developed by the District: Alamitos Creek Draft Sediment Transport Technical Memorandum (2017) and Alamitos Creek Bankfull Discharge Technical Memorandum (2016) (page 3.K-24).

ID	Issue Text	Response Text
	objective of this Project, CDFW recommends that Valley Water consider inclusion of specific features that will improve habitat conditions for steelhead, such as large woody debris structures, and construction of secondary channels which are important 'habitats utilized by juvenile salmon and steelhead. San Francisco Estuary Institute's technical memorandum on Historical Vegetation and Drainage Patterns in Western Santa Clara Valley (Beller et al. 2010) is an important resource that should be considered to inform design concepts. CDFW recommends that the Project design team begin coordinating at each stage of design with CDFW staff and the National Marine Fisheries Service. We strongly believe that the design and implementation of projects of this scale are greatly facilitated when an iterative process is established that includes close coordination between scientists and engineers at the resource agencies and an experienced multi-disciplinary project design team.	The model described in the Alamitos Creek Draft Sediment Transport Technical Memorandum (2017) indicates that the sediment would move through the project reach and drop into the pit downstream of Coleman Road (downstream limit of the project). This pit would be filled up with sediment and eventually cease to exist. This pit is estimated to be able to contain approximately 4,000 cubic yards of material. In addition, some sediment would accumulate within the Project reach up to a natural equilibrium, then sediment will be conveyed downstream similar to the upstream reaches of Alamitos Creek. Because the channel is being restored and separated from the lake, the lake would no longer act as a sediment sink and the new channel would promote sediment transport in the Guadalupe Watershed. Based on bathymetric survey data from 2011, 2017, and 2019, the project team estimates that the new creek channel could convey up to roughly 1,000 CY of sediment annually on average after the restored channel reaches a natural equilibrium. This is a preliminary estimate, and the project hydraulic models and associated sediment transport technical memorandum would be updated should the Project be approved by the District Board of Directors and design progress. The project team's preliminary estimates show that no sediment removal would be necessary in the future from the restored creek channel. Once the pool downstream of Coleman Road fills up and the restored channel reaches equilibrium in terms of sediment deposition, the District would continue to remove sediment as a regular maintenance action, at the confluence of Alamitos and Guadalupe Creeks, downstream of the newly restored channel. The District conducts periodic sediment removal at the confluence of Alamitos and Guadalupe Creeks, under the Stream Maintenance Program, to remove mercury-laden sediments from the system before they reach San Francisco Bay where they can be harmful. Other clean sediment removed from this area could be beneficially reused for other projects such as gravel augmentation and ecotone construction. The frequency and amount of sediment removal necessary would be finalized in a detailed maintenance plan that would be submitted to CDFW as a part of the permitting process based on the final design. If the project is approved, the project design would advance to include more detailed plans that include features to provide beneficial habitat for all life stages. Habitat features would likely include boulders, large woody debris, and backwater alcoves. The District is looking forward to working with the resource agencies to implement these project details. These details would not alter the environmental evaluation of the Project provided in the EIR.
S-001-CDFW-6	The draft EIR states that a levee would be constructed to separate the lake from the creek. The levee would be constructed using clean fill along with cement deep soil mixing (CDSM) at the base of the levee for reinforcement. The draft EIR also states that there is potential for California ground squirrel (Otospermophifus beechey1) to occur within the Project area. Considering that levee maintenance typically includes fossorial mammal control to eliminate burrows as well as other maintenance activities that could result in potential impacts to biological resources, and sediment run-off into the stream, CDFW recommends that the draft EIR consider other options to construction of an earthen levee or further discuss how potential impacts to biological resources could be reduced from future maintenance activities.	The EIR considers the impacts of operational activities, including levee maintenance, on biological resources and water quality in EIR Sections 3.D, 3.E, 3.K, and 3.J. The District uses live trap methods for fossorial mammal control throughout the District, and would repair damage to the levee as necessary, similar to other District levees. These activities would not result in substantial adverse effects because maintenance activities would be infrequent, and would only require brief periods of activity at each location when maintenance is required. As discussed in Impact 3.D-1, future maintenance would include bank stabilization as needed. These maintenance activities would be conducted in a manner consistent with the District's Stream Maintenance Program, and the same existing regulations and District BMPs discussed under Construction such as implementation of BMPs WQ-3, WQ-5, WQ-6, WQ-9, WQ-10, WQ-12, WQ-

ID	Issue Text	Response Text
		13, WQ-15 and WQ-16. Adherence to existing regulation and implementation of District BMPs would ensure that stormwater pollutant impacts during maintenance activities would be minimized and would be less than significant, and that any potential water quality releases would not degrade beneficial use or interfere with implementation of the Basin Plan.
S-001-CDFW-7	The draft EIR states that the preferred alternative would address and improve water quality such as methyl mercury accumulation within Almaden Lake, but it is unclear if or how improvements would occur downstream. The Project area of the preferred alternative encompasses Almaden Lake Park, a section of Alamitos Creek adjacent to the park, and a portion of Guadalupe Creek and the Los Alamitos Percolation Pond (part of the Alamitos diversion dam facility). Water quality monitoring should extend to the Alamitos flashboard dam, considering that it is closely linked to the preferred alternative and existing conditions at the dam may be similar to the lake. CDFW therefore recommends that the EIR include water quality monitoring not just within Almaden Lake but within Alamitos Creek and Guadalupe River (at the Alamitos diversion dam) as well.	This comment does not raise any issues regarding adequacy of the EIR's analysis of the Project's adverse environmental impacts. There is no requirement under CEQA to monitor potential project *benefits* outside the Project study area as defined in Draft EIR Section 2.B. The Project area's downstream boundary is the Coleman Road bridge. The Project's purpose (see Draft EIR Section 2.C.3) is geographically limited: to "restore Alamitos Creek's function *within the footprint of Almaden Lake Park* in order to improve physical habitat for steelhead and other anadromous fish, *while improving water quality within the lake footprint*, and minimizing impacts to existing recreational features within the Park (emphasis added). Although specific monitoring is not proposed as part of the Project, The District has on-going water quality monitoring throughout the watershed: • Temperature monitoring is conducted throughout the Guadalupe Watershed for FAHCE related studies. A total of 22 loggers are deployed year-round within the Guadalupe River, Guadalupe Creek, Alamitos Creek, Calero Creek, and Los Gatos Creek. These loggers recorded temperature every hour and are serviced and downloaded every two to four months. This monitoring is being conducted voluntarily, but there is currently no end date for this monitoring. • The District also collects instantaneous water quality data (temperature, conductivity, and turbidity) during all juvenile steelhead sampling events conducted in the fall. Currently 24 locations are sampled once a year throughout the watershed. • As part of a coordinated monitoring program various water quality parameters are monitored at Guadalupe River and Highway 101 during large storms through 2023. The District does not consider the flashboard dam to be a closely linked facility to the Project. Please see the Master Response above (Section G.3.2, Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat) for a discussion why these comments do not affect the adequacy of the EIR's analysis of the Project's adverse environmental impacts or present new adverse environmental impacts caused by the Project.

ID	Issue Text	Response Text
S-001-CDFW-8	The draft EIR states that 81 trees will be removed during Project construction under the preferred alternative and that a small portion of them occur within riparian habitat. CDFW recommends that a figure be included showing the location of the trees in relation to habitat types. Additionally, the EIR should include an impacts table that identifies impacts specific to habitat types not just Project features (Table 3.D-2}.	The identification of potential tree removal was based on a preliminary evaluation of trees in the Project area, and conservatively assumed that most trees around the Lake perimeter would be removed; thus provision of a figure showing the location of trees to be removed is premature. However, as s shown on EIR Figure 3.D-1a, the habitat around the Lake perimeter is primarily Landscaped/Developed, and trees present and conservatively assumed to be removed for the most part are primarily planted ornamental and non-native species. Small areas of riparian habitat are present at the lake perimeter where Alamitos Creek enters and exits the lake. Impact 3.D-3 indicates that the Project includes a small area of riparian habitat, which are located in these areas as well as the locations where the inlet pipeline would cross under Alamitos Creek and the outlet pipeline would cross under Guadalupe Creek. Because trenchless construction techniques would be used for these crossings, direct impacts to riparian habitat would be avoided. Thus, the total direct effect on riparian habitat is substantially less than an acre of riparian habitat. It is noted that riparian habitat within the study area has been reduced since publication of the Draft EIR, as the import pipeline alignment has been revised to primarily be located along a paved roadway rather than along the Los Alamitos Creek Trail. Regarding impacts to sensitive habitats, Impact 3.D-4 discusses impacts on jurisdictional wetlands, waters, and riparian communities, and includes a discussion of permanent impacts. As discussed, the restoration of the creek channel and floodplain would permanently convert open water to creek and floodplain habitat. Permanent and temporary impacts to wetlands and waters would be offset by a net gain in wetland and water function and values after Project implementation, as the Project is intended to benefit wetlands and open water habitats in the near and long term. In addition, the benefits of creek restoration and enhancements to the lake would extend beyond the Project footprint. This is because opening fish passage by restoring Alamitos Creek would benefit steelhead and Chinook salmon, which both require unimpaired and unconstrained passage from freshwater to the ocean to complete their life history and to sustain local populations. The Project would also improve water quality in discharges into the Guadalupe River system because methylmercury production in the Lake would be minimized. The Project's benefits to the open water of Almaden Lake include a reduction in the presence of mercury methylation and reduced anoxic conditions, which would improve water quality in the lake. The new source of water in the lake would have a lower elemental mercury content. The Project removes the direct linkage of Alamitos Creek water flowing into the lake and eliminating the deposition of elemental mercury into the lake from upstream sources thereby improving the quality of the waters in the Study Area and the Guadalupe River system downstream. The native wetland vegetation and improved water quality provided by the Project in the lower floodplain, on the levee, and on the expanded and new islands, would result in a greater quantity and overall benefit to the wetland community compared to existing wetlands, which are isolated and small in size. The wetlands proposed by the Project upon refilling the lake would be consistent with existing Alamitos Creek upstream channel vegetation and would enhance wetland habitat structure and diversity. The improved ecosystem resulting from the conversion of Almaden Lake open water to creek and floodplain would slow and sequester runoff and associated pollutants and fine sediment before they enter the restored creek and lake waters. The removal of water nutrients and addition of dissolved oxygen would further enhance ecosystem function

ID	Issue Text	Response Text
		and reduce the potential of algal blooms affecting water quality and wildlife habitat. Wetlands and waters in the Study Area would benefit from naturally functioning ecosystem offered by the Project. The planting of the new creek, floodplain, and lake margins would provide ecosystem services that are not provided under existing conditions, such as stream temperature maintenance, nutrient uptake, and continuous habitat for a diversity of species. The new levee and Park area that would convert degraded Almaden Lake open water to upland habitat are necessary to provide the enhanced lake, creek and floodplain habitat and functions provided by the Project. Although these areas would no longer be jurisdictional waters, they would also be planted to enhance habitat conditions for native wildlife. As such, permanent impacts to wetlands and waters as a result of the Project construction would be less than significant. Enhancement to water quality and beneficial uses in jurisdictional waters achieved by the Project would more than compensate for the Project's temporary construction impacts, as well as impacts of the District's Upper Berryessa Project.
S-001-CDFW-9	As part of the preferred alternative, the draft EIR states that the existing island in the lake, which is nesting bird habitat for a number of species (e.g., herons and egrets), will be expanded. Part of the activities for the expansion include excavation, which could result in significant disturbance to nesting birds if conducted during the nesting bird season. The EIR should fully address how construction-related work will avoid take of nesting birds (pursuant to Fish and Game Code section 3503 and 3503.5}. The EIR should also include more detailed information on the potential direct and indirect impacts to nesting, roosting, denning, perching, foraging and other habitat types for wildlife species that occur on the islands, including birds and bats. Furthermore, the EIR should describe potential impacts of dewatering the lake and interrupted feeding to bird species using this area, as well as impacts to other wildlife species dependent on the aquatic habitat. CDFW recommends that the EIR include effective avoidance, and minimization measures and compensatory mitigation for all impacts of the Project to nesting birds and other wildlife that cannot be completely avoided. Table S-2 and within Chapter 3 describe the nesting bird season from February 1 to August 31. CDFW recommends that this information be updated to the timeframe of January 15 to September 1. Additionally, nesting bird surveys for passerines should include two surveys (Draft EIR states only one survey will be conducted). The first to be conducted at least within 7 days prior to the beginning of Project related activities, and an additional survey conducted within 48 hours prior to the start of Project related activities. If there is a lapse of 7 days (not 10 days) or longer in Project related activities, another focused survey should be conducted. Additional surveys for raptors may be necessary especially surveys earlier in the nesting season to document early signs of nesting when raptors are more conspicuous.	Please see EIR Impact 3.D-1, which provides a sufficient level of detail on construction and operational impacts to special status-birds, common nesting migratory birds and raptors, and roosting bats. Construction activities, including dewatering, could result in resident and migratory birds and raptors leaving the Project area during the construction period. However, the Project area is within an urbanized setting with a high level of human use and with high volume roadways adjacent to the park, and avian species and bats utilizing the area are accustomed to some human activity. Further, the surrounding region contains suitable habitats, including riparian habitat along Alamitos Creek, Guadalupe Creek, and Guadalupe River; open water habitat at the Los Capitancillos, Alamitos, and Guadalupe Ponds; and oak woodlands to the east, south, and west for resident and migratory birds and raptors to nest and forage. As discussed, the District would implement BMP BI-5, Avoid Impacts to Nesting Migratory Birds, and BI-6, Avoid Impacts to Nesting Migratory Birds from Pending Construction, to determine if active nests are located with the Project footprint. These measures, together with existing state and federal regulations would reduce the level of impacts on nesting migratory birds and raptors. However, the loss or disturbance of an active nest would be a significant impact. Implementation of Mitigation Measure 3.D-1a: Nesting Bird Protection Measures would ensure that the Project would have a less than significant impact on nesting birds, and avoids take of nesting birds, by establishing no work buffer zones around active nests identified on or near the Project area. These avoidance and mitigation measures together ensure that impacts to nesting birds and other wildlife is reduced to a less than significant level. Regarding impacts to bird and wildlife species during project construction, see also Impact 3.D-5, which notes that the construction phase of the Project could temporarily alter terrestrial wildlife movement or native wildlife nursery site in Alamitos Creek corridor or Almaden Lake; however, the area of impact and proposed construction duration would not substantially impact or impede these activities. Suitable movement corridors and habitat for these species are found immediately upstream and downstream of the Study Area. The District does not believe nesting surveys need to be increased from one to two surveys, conducted within 7 days of the start of Project activities, in all instances. A

ID	Issue Text	Response Text
		48-hour survey window provides a very conservative level of protection, which is not always necessary based on the experience and training of biological staff as well as worker awareness training that would be provided consistent with SCVHP Avoidance and Minimization Measures that would implemented as part of the Project. This training helps ensure that contractors and District staff are aware of the consequence and ecological concern associated with nesting birds. In response to this comment, while maintaining the flexibility based on the judgement of the qualified biologist, Mitigation Measure 3.D-1a has been modified to reflect a bird nesting season appropriate for the species that have potential to occur in the study area, and to reflect a change in nesting survey timeframes. This change allows cost efficient and effective surveys to protect nesting birds and providing a high level of protection. This modification does not change the impact conclusion associated with Impact 3.D-1, which remains less than significant with mitigation. ***Mitigation Measure 3.D-1a*: *Nesting Bird Protection Measures***. The District and/or its contractor(s) shall implement the following during construction of the Project: • Removal of trees and scrub vegetation shall occur outside the bird nesting season (January 15 ~~February 1~~ to September 1~~August 31~~), to the extent feasible. • If removal of trees and vegetation cannot be fully accomplished outside of nesting season, a qualified biologist shall conduct the necessary preconstruction nesting surveys within seven days prior to the start of such activities or after any construction breaks of seven ~~10~~ days or more. Surveys shall be performed for the Study Area and suitable habitat within 250 feet of the project site to locate any active raptor (birds of prey) nests or rookeries. • If active nests are located during the preconstruction bird nesting survey, the qualified biologist shall evaluate if the schedule of construction activities could affect the active nests and the following measures shall be implemented based on their determination: – If construction is not likely to affect the active nest, it may proceed without restriction; however, a biologist shall regularly monitor the nest to confirm there is no adverse effect and may revise their determination at any time during the nesting season. In this case, the following measure would apply. – If construction may affect the active nest, the biologist shall establish a no disturbance buffer in consultation with CDFW. Typically, these buffer distances are 50 feet for passerines and between 300 feet for raptors. These distances may be adjusted depending on the level of surrounding ambient activity (e.g., if the project area is adjacent to a road or active trail) and if an obstruction, such as a building, is within line-of-sight between the nest and construction. For bird species that are federally and/or state-listed sensitive species (i.e., fully protected, endangered, threatened, species of special concern), a District ~~or City~~ representative, supported by the qualified biologist, shall coordinate with the USFWS and/or CDFW regarding modifications to nest buffers, prohibiting

ID	Issue Text	Response Text
		construction within the buffer, modifying construction, or removing or relocating active nests that are found on the site. – Any birds that begin nesting within the project area and survey buffers amid construction activities are assumed to be habituated to construction-related or similar noise and disturbance levels. Qualified biologist, shall coordinate with the USFWS and/or CDFW and determine if no work exclusion zones shall be established around active nests in these cases.
S-001-CDFW-10	CDFW appreciates that Valley Water submitted the 30% design plans for the preferred alternative project on January 29, 2020. At this time, we have not had a chance to review these plans in their entirety but will in the near future, and we look forward to coordinating and discussing these designs in further detail with Valley Water. At this time, CDFW recommends that clarification be provided and additional information be included in the EIR. The longitudinal profile provided indicates that when the flashboards are raised at the Alamitos flashboard dam, the water surface can be impounded to a maximum elevation of 192 feet, and a footnote on the profile indicates the water surface is typically maintained at 188 feet. Please provide further details and clarification on typical water surface level during operation of the dam. The draft EIR currently states that with the preferred alternative, only 200 feet of the restored channel would be impacted by operation of the flashboard dam. However, if water is lmpounded above 188 feet, a much greater length of the restored channel versus what is indicated in the draft EIR would be backwatered by the dam.	Please see the Master Response above (Section G.3.2, Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat) for a discussion of why these comments do not affect the adequacy of the EIR's analysis of the Project's adverse environmental impacts or present new adverse environmental impacts caused by the Project.
S-001-CDFW-11	The draft EIR states that the reasons for rejecting Option 8 were for the following: it would not reduce the significant environmental impacts of the Project; it would be beyond the scope and budget provided by Valley Water's Board; it could lead to downstream loss of potentially jurisdictional waters of the U.S.; and there is uncertainty of the feasibility of an alternate diversion system. The environmental impacts described for Option 8 are related to construction activities; however, the draft EIR does not fully address and acknowledge the overall and long-term benefit of a reach-wide project versus a site-specific project. CDFW believes that implementation of Option 8 would provide substantial environmental benefits greater than the preferred alternative analyzed in the draft EIR. These environmental benefits include: • Restoration of a larger segment of Alamitos Creek and Guadalupe River and associated riparian areas and floodplain ecosystem. Conditions would greatly improve habitat for Central California Coast (CCC) steelhead trout (Oncorhynchus mykiss) and other native fish. • Removal of the Alamitos flashboard dam would restore 1,700 feet of stream channel that currently becomes impounded when weir panels are raised. Similar to Almaden Lake, the impoundment created by the flashboard dam warms and impairs downstream water and provides habitat suitable for non-native predatory fish. This negatively impacts steelhead and other native fish. Removal of the flashboard dam would further improve conditions for steelhead and other native fish by improving water temperatures and reducing non native predatory fish populations in the Project vicinity.	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, does not qualify as a CEQA Alternative to the Project. Also, please see response to comment O-001-CalTrout.SFB-7 for further discussion of reasons for rejecting Option 8.

ID	Issue Text	Response Text
	• Fish passage improvements with removal of the Alamitos flashboard dam. The Alamitos flashboard dam, despite having a fish ladder, negatively impacts fish passage. Passage through the reach with the flashboard dam is presumably most problematic for steelhead smolts due to the slack water, lack of cover in the channel, abundance of non-native predatory fish, and impaired temperature conditions that result from the operation of the flashboard dam. Also, during high flow conditions when the flashboards are typically removed, downstream migrating smolts and steelhead kelts are likely to pass the flashboard dam via spill over the dam face and energy dissipation structure at the base of the dam and not through the fish ladder. This could cause injury or mortality to migrating fish. A natural stream channel in this corridor would improve passage conditions for steelhead and other native fish in the watershed. • Restoration of sediment transport and reduction of aggradation. The Alamitos flashboard dam impairs sediment movement in the Guadalupe River. Removing the flashboard dam would reduce aggradation in the reach upstream and restore sediment transport downstream which would enhance stream habitat conditions for native fish. This would also alleviate the need for channel maintenance and sediment removal periodically performed by Valley Water upstream of the existing flashboard dam to maintain stream channel capacity and conveyance. • Valley Water would no longer have to maintain Alamitos flashboard dam and fishway. Valley Water would potentially be able to divert water more frequently from the Guadalupe River, since diversion could be operated during a wider period in the calendar year. Currently the flashboards at this facility are removed in the winter and diversion ceases since operation is a flood hazard during higher flows. Taking into account these benefits, CDFW believes that Option 8, when weighed against alternatives considered in the draft EIR, is the environmentally superior alternative. Valley Water's reasons to reject Option 8 may be valid, but further evaluation is needed. With Option 8, the existing impoundment behind the flashboard dam would be restored to a more natural stream channel and floodplain ecosystem as mentioned previously. Furthermore, although there may be uncertainty in the feasibility of an alternate diversion system, Valley Water may not have fully considered an alternate diversion system. Table 4-3 of the draft EIR lists a pumping station and fish screens as an alternative water diversion mechanism to divert water to Alamitos and Guadalupe recharge ponds. A gravity fed infiltration gallery may also be a feasible, cost effective and an environmentally superior mechanism capable of supplying diverted water to these recharge facilities. Option 8 could also be constructed in a two-phase approach, if needed. In the first phase, Alamitos Creek would be separated from Almaden Lake, and in the second phase, the profile of the stream channel and floodplain would be constructed to tie-in with removal of the Alamitos flashboard dam along with re-grading the channel profile in this section. CDFW is available to assist Valley Water in developing Option 8. CDFW strongly recommends that Valley Water reconsider Option 8 as the preferred alternative for this Project. We recognize that this would cause a significant delay in implementing the Project with additional planning and potentially additional costs. The current preferred alternative would also benefit steelhead trout and other native	

ID	Issue Text	Response Text
	fish as well as other biological resources, but restoring the entire Alamitos flashboard dam and Almaden Lake reach to a more natural riverine channel and floodplain ecosystem with restored sediment transport, would provide a much more substantial ecological benefit.	
S-001-CDFW-12	California Endangered Species Act Please be advised that a CESA ITP must be obtained if the Project has the potential to result in "take" of plants or animals listed under CESA, either during construction or over the life of the Project. Issuance of a CESA ITP is subject to CEQA documentation; the CEQA document must specify impacts, mitigation measures, and a mitigation monitoring and reporting program. If the Project will impact CESA listed species, early consultation is encouraged, as significant modification to the Project and mitigation measures may be required in order to obtain a CESA ITP. For more information on CESA and the ITP application process, please visit our website at: http://www.wildlife.ca.gov/Conservation/CESA. CEQA requires a Mandatory Finding of Significance if a project is likely to substantially restrict the range or reduce the population of a threatened or endangered species. (Pub. Resources Code, §§ 21001, subd. (c), 21083; CEQA Guidelines, §§ 15380, 15064, and 15065). Impacts must be avoided or mitigated to less-than -significant levels unless the CEQA Lead Agency makes and supports Findings of Overriding Consideration (FOC). The CEQA Lead Agency's FOC does not eliminate the Project proponent's obligation to comply with CESA.	This comment is noted. EIR Table 2-3 includes a list of likely permits and approvals necessary for Project implementation, and includes California Endangered Species Act authorization from the CDFW for aquatic species. Take authorization for terrestrial species, if required, would be through the Santa Clara Valley Habitat Plan. Should the District certify the Project EIR and approve the Project, further coordination with CDFW and the Santa Clara Valley Habitat Agency would occur to apply for any necessary permits. As noted, this EIR presents environmental reviews that will support agencies' permitting and approval processes. The District agrees that a lead agency's Statement of Overriding Considerations does not eliminate the requirement to comply with CESA. Please note that Impact 3D-1 and 3E-1 fully discloses Project impacts to special status species, and concludes they are less than significant with mitigation, and a statement of overriding considerations would not be required for these effects. Further, the EIR analysis does not indicate a likelihood of take of plants or animals listed under CEQA.
S-001-CDFW-13	CDFW requires an LSA Notification, pursuant to Fish and Game Code section1600 et. seq., for Project activities affecting lakes or streams and associated riparian habitat. Notification is required for any activity that may substantially divert or obstruct the natural flow; change or use material from the bed, channel, or bank including associated riparian or wetland resource s; or deposit or dispose of material where it may pass into a river, lake or stream. Work within ephemeral streams, washes, watercourses with a subsurface flow, and floodplains are subject to notification requirements. CDFW will consider the CEQA document for the Project for issuance of the LSA Agreement. CDFW may not execute the final LSA Agreement (or ITP) until it has complied with CEQA as a Responsible Agency. CDFW recommends that Valley Water submit an LSA Notification when 60% design plans for the Project are prepared as well as encourages early consultation when 30% design plans are available.	This comment is noted. EIR Table 2-3 includes a list of likely permits and approvals necessary for Project implementation, and includes a Lake and Streambed Alteration Agreement from the CDFW. Should the District certify the Project EIR and approve the Project, further coordination with CDFW and the Santa Clara Valley Habitat Agency would occur to apply for any necessary permits. As noted, this EIR presents environmental reviews that will support agencies' permitting and approval processes
S-001-CDFW-14	CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations. [Pub. Resources Code, § 21003, subd. (e)]. Accordingly, please report any special-status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Submittinq-Data. The completed form can be submitted online or emailed to CNDDB at the following email address: cnddb@wildlife.ca.qov. The types of information reported to CNDDB can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Plants-and-Animals	Please see EIR Page 3.D-8, noting that no special-status plants are expected to occur in the Study Area and none were observed during the reconnaissance level field survey and wetland delineations conducted for this Project. Further, as indicated on EIR pages 3.D-8 through 3.D-13, special-status wildlife species were not observed during the reconnaissance level field survey and wetland delineations conducted for this Project. As discussed on EIR page 3.D-13, due to the developed nature of the Study Area as described above, no terrestrial sensitive or special-status natural communities, other than riparian areas, are present. Public Resource Code Section 21003(d) is not a "requirement" for data base incorporation; rather it is statement of general state policy. However, the District

ID	Issue Text	Response Text
		would report any special status species detected during construction surveys should they occur.
S-001-CDFW-15	The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary (Fish and Game Code, § 711.4; Pub. Resources Code, § 21089). Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW.	This comment is noted. Should the District certify the EIR and approve the Project, a Notice of Determination including required CDFW filing fees, would be submitted to the County Clerk-Recorded.

ID	Issue Text	Response Text
S-002-GCRCD-1	The GCRCD has viewed the separation of Alamitos Creek from Lake Almaden as a priority project for protection of fisheries on the Guadalupe River for many years. As GCRCD staff and consultants have previously discussed with Valley Water staff, this project has the potential to improve water quality, native fish routing, sediment routing, riparian vegetation, and to provide other ecological benefits. Accordingly, we are very supportive of this project, subject to recommended modifications described below, as it could be the most important restoration project on the Guadalupe River to date to improve fisheries and channel conditions, particularly if the project is expanded to address the ecological and water quality problems caused by the Alamitos Drop Structure.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project.
S-002-GCRCD-2	First, GCRCD is supportive of the Project Objectives stated in Section 2.C.3. In particular, we want to equally emphasize the objectives in the paragraph that follow the itemized objectives at the beginning of the section (fish passage/linkages, sediment routing, habitat restoration). Another objective that should be considered if South Bay Aqueduct (SBA) water is to be imported into the river corridor is to include "reduce potential introduction of non-native fish and vegetation." Second, while this project is not yet under the umbrella of the One Water objectives, this project could and should fully align with the One Water objectives, specifically for the following five One Water objectives: E: Expanded Floodplains F: Supportive Stream Flows G: Resilient Habitats H: Climate Change J: Community Engagement	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Regarding project objectives, under CEQA, the District has considerable discretion to identify and pursue a particular project designed to meet a particular set of objectives. California Oak Foundation v. Regents of University of California (2010) 188 Cal.App. 4th 227,276.
S-002-GCRCD-3	As we have commented to the District in the past, the Guadalupe Creek – Alamitos Creek confluence is one of the most important reaches in the entire Guadalupe River system with respect to ecological function. In addition to the water quality issues associated with Almaden Lake, the Alamitos Drop Structure continues to cause other environmental impacts, including: • The backwater caused by the Alamitos Drop Structure is a coarse sediment routing impediment that impairs the restoration strategy of the 2013 Gravel Augmentation Plan (ACOE 2013),	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA Alternative to the Project. Also, please see response to comment O-001-CalTrout.SFB-7 for further discussion of reasons for rejecting Option 8.

ID	Issue Text	Response Text
	• Despite having a fish ladder, the drop structure can cause upstream fish passage impediments and/or delays, • The drop structure likely reduces downstream steelhead (juveniles, smolts, and kelts) and Chinook salmon (juveniles, smolts) migration survival, • The approximate 10 ft drop and concrete energy dissipation structure on the downstream side of the drop structure likely increases predation on juvenile and adult salmonids due to injury and/or disorientation, and • The 10 ft elevational difference caused by the drop structure is a substantial perturbation in the gradient of the river through the reach (Almaden Lake and Alamitos Drop Structure). The project will likely improve the site conditions at Almaden Lake, but it will miss substantial opportunities to greatly improve the reach (i.e., from Mazzone Drive Bridge to Highway 85 Bridge). One Water, the Gravel Augmentation Plan, and the current understanding of ecological restoration needs all mandate that we look beyond the site scale and consider the alternatives from a reach scale perspective. In the absence of this broader perspective, substantial cost-effective restoration opportunities will be forgone. Of the alternatives considered in the DEIR, Option 8 best addresses improvements at this reach scale, and therefore better meets the objectives and spirit of One Water. Specific comments to support reconsideration of Option 8 include: • The project should be evaluated in a larger context beyond the short reach from Coleman Road to Mazzone Drive. A long-term solution is needed for improving ecological function in the reach, including improve physical channel conditions, improving sediment routing, improving gravel supply and spawning/rearing habitat downstream of Alamitos Drop Structure, improving fish passage, reducing thermal loading on the stream, and reducing long-term maintenance to the District. A foundation for achieving these improvements is to restore a natural stream grade through the reach, not just the Almaden Lake site. • Alamitos Drop Structure has caused sediment to accumulate at the confluence of Guadalupe Creek; this has caused maintenance needs for fish passage and flood conveyance under Almaden Expressway Bridge. Removal of Alamitos Drop Structure and installation of an alternative diversion infrastructure will restore (steepen) the natural grade of the stream, and allow sediment and fish to pass freely through the reach. • As noted in Xu (2017), the slope reduction caused by the Alamitos Drop Structure will cause sediment to deposit downstream of Coleman Road Bridge, as has been happening on Guadalupe Creek. Subtle changes in channel cross section without addressing the slope discontinuity will continue to cause sediment to deposit upstream of the Alamitos Drop Structure and starve downstream reaches of gravel (which is needed as described in the Gravel Augmentation Plan). • Even though there is an adult fish ladder in place, removal of the Alamitos Drop Structure will facilitate better upstream fish passage for all native species by way of less passage delay, less predation risk, and less structure maintenance). • Because most juvenile salmonid outmigrants and adult kelts move downstream during moderate to higher flows in the winter and early spring when water is	

ID	Issue Text	Response Text
	spilling across the structure, these fish will likely have to pass over the drop structure and into the energy dissipation structures at the base of the structure (rather than go down the fish ladder). This will cause physical injury or mortality to these salmonids, and subject surviving fish to increased predation risk immediately downstream due to injury and/or disorientation. • Restoring the natural grade of the stream through this reach will improve habitat resiliency via natural sediment routing, natural water surface fluctuations (rather than flashboard operations), more natural riparian vegetation establishment keyed into the underlying hydrology, and reduced water temperatures due to elimination of backwater habitats from the structure. In addition, downstream reaches will have greater resiliency due to restoration of full sediment routing through the reach. While the preferred alternative improves conditions at the Almaden Lake site, it does little to improve conditions downstream. Lastly, expanding the project to restore the reach should improve the Guadalupe River's resiliency to climate change, particularly with respect to changes in hydrology and sediment routing.	
S-002-GCRCD-4	The DEIR considers and rejects Option 8 from consideration for four reasons (Page 4-32), and each is discussed below. • Reason #1: "Does not reduce any of the significant environmental impacts of the Project"- The approach of distinguishing between the Alternatives evaluation based on Long Term Environmental Impacts may be a valid approach, but for this project, it is not appropriate because there is only one long-term impact (Noise). Any of the alternatives except "no action" would fall under this exclusionary criterion because they all cause significant noise impacts. If all of the project objectives described in Section 2.C.3 and the One Water objectives are considered as selection criteria, Option 8 would likely be ranked the highest for those objectives (inclusive of sediment routing, fish passage/linkages, and habitat restoration). Furthermore, if these objectives were considered for the reach instead of the site (including downstream of Alamitos Drop Structure), Option 8 would further stand out as the environmentally preferable option. • Reason #2: "Beyond the scope and budget provided by the Valley Water's Board"- The DEIR does not present the benefits of the project at the reach scale, and with respect to project and One Water objectives. Accordingly, we are concerned that this exclusionary criterion is being used to eliminate the environmentally preferable alternative without the Board having the opportunity to consider it. • Reason #3: "Downstream loss of potentially jurisdictional Waters of the US"- This loss of jurisdictional water, if any, would be very small. More importantly, the ecological value of the post-project jurisdictional waters would be greatly enhanced (a functioning river corridor rather than a wide, flat water heater), and would almost certainly provide greater habitat benefits at the site and in downstream reaches than the Preferred Alternative. • Reason #4 "Uncertainty about feasibility of alternative water diversion system"- There are numerous solutions to alternative water diversion systems. The uncertainty is due to lack of study, which can be remedied with a combination of value engineering planning, scoping, feasibility assessment, and design. For	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA Alternative to the Project. Besides noise impacts, the EIR has identified significant impacts (pre-mitigation) from construction and operation of the Project on other resource areas. See Table S-2 for a complete listing. The ability of the alternatives, evaluated in detail, to reduce these impacts is summarized in DEIR Section 4.C. The commenter's discussion of "selection criteria" based on ability to meet project objectives is not consistent with CEQA's framework, which is to identify an environmentally superior alternative that has on balance the least environmental impacts. In addition, the general list of One Water objectives was developed for a different purpose, and is independent from the Project-specific objectives that were properly used to help develop the range of DEIR alternatives. Based on the above considerations, and statutory requirements of CEQA, Alternative 2 is the environmentally preferred alternative. An EIR is not required to analyze alternatives that are infeasible. CEQA Guidelines Section 15126.6(a). Alternatives that are not potentially feasible can be excluded from an EIR's range of alternatives that are evaluated in detail. ""Feasible" means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account *economic*, environmental, legal, social, and technological factors." CEQA Guidelines Section 15364, emphasis added. The purpose of an EIR is to analyze the potential impacts of a project and to incorporate changes to the project or implement mitigation measures to avoid or reduce significant impacts; the purpose is not to present project benefits. The selection of CEQA alternatives and the designation of an environmentally preferable alternative is not focused on maximizing ecological benefits, rather it is focused on minimizing adverse environmental effects. The downstream loss of jurisdictional waters is another example of how project impacts would increase with an expanded project. An expanded restoration project would likely provide better ecological benefits but would also have more direct impacts to jurisdictional waters.

ID	Issue Text	Response Text
	example, if Alamitos Drop Structure is removed, an engineered infiltration gallery could be installed under the stream channel at the upstream end of Almaden Lake site, and a gravity fed pipe could deliver needed water to the downstream percolation ponds. This would preclude the need for any fish screening, would eliminate adult fish migration delays or impediments, eliminate elevated downstream migration mortality and predation, allow coarse sediment to naturally route downstream and replenish gravel storage in downstream reaches, restore a riparian corridor through the reach, and reduce thermal exposure and heating in the reach. These alternative water diversion systems have been designed and implemented in many places (e.g., lower Tuolumne River infiltration gallery), and the uncertainty can be remedied with standard engineering study. Again, if One Water and the additional objectives at the top of Page 4-3 were considered, Option 8 would likely be superior to all other alternatives based on the objectives. Lastly, an important consideration is the remaining environmental impacts of NOT remediating the impacts of the Alamitos Drop Structure. If the remedy of ongoing environmental impacts of the Alamitos Drop Structure were considered in the evaluation of alternatives, then Option 8 would again be a superior alternative because it is the only alternative that remedies the ecological impacts caused by the drop structure.	The uncertainty of an alternative water diversion system to maintain groundwater recharge in the Alamitos and Guadalupe Ponds was provided as an example of the additional time, money, and effort that would be necessary to remove the drop structure. Any alteration of the existing diversion structure would require alteration of the related water right with the State Water Resources Board, a multi-year process that would add uncertainly to the District's water rights. Note that a feasible alternative must also be able to be accomplished in a reasonable period of time. The construction, operation, and maintenance of a new diversion structure would include its own adverse impacts to Alamitos Creek; any type of in-stream diversion structure that ponds water would result in similar impacts than those trying to be avoided. An infiltration gallery as suggested would likely result in the net loss of in-stream groundwater recharge and require regular in-stream maintenance.
S-002-GCRCD-5	If the project is going to periodically deliver SBA water into Almaden Lake and the percolation ponds, there needs to be preventative measures implemented to ensure that SBA water is isolated from the Guadalupe River to avoid more introduction of more non-native aquatic species and vegetation into the Guadalupe River corridor. With the proposed SBA water delivery, it appears that the summer water diversion need should be reduced to <4.5 cfs, which can easily be accommodated by an infiltration gallery or other small-scale diversion strategy, further rendering the Alamitos Drop Structure to no longer be needed. If Alamitos Drop Structure is not removed, water surface and shallow groundwater elevations will unnaturally fluctuate due to operation of the flashboards. These unnatural hydrologic fluctuations would likely impair the proposed riparian restoration in the Almaden Lake footprint, which may result in cycles of riparian establishment and desiccation in the project site. For example, vegetation that is established at higher elevations when the flashboards are installed may subsequently be desiccated and die when the flashboards are removed. Similarly, vegetation that is established lower in the channel when the flashboards are out could incur inundation mortality when the flashboards are re-installed. This artificial impact to vegetation would not occur if Option 8 was implemented.	Imported water from the Santa Clara Conduit (from San Luis Reservoir) and South Bay Aqueduct are regularly released into Calero Reservoir, Alamitos Creek, and Guadalupe Creek as part of groundwater recharge operations. The use of imported water to the isolated Almaden Lake and percolation ponds is similar to these existing practices. Water is rarely discharged from percolation ponds to Guadalupe River, and see the response to Comment S-003-RWQCB-2; regarding periodic overflow of the lake into Alamitos Creek. The use of imported water as proposed does not result in new impact to biologic resources or water quality. Regarding removal of the Alamitos Drop Structure, please see the Master Response above (Section G.3.2, Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat) for a discussion why these comments do not affect the adequacy of the EIR's analysis of the Project's adverse environmental impacts or present new adverse environmental impacts caused by the Project.
S-002-GCRCD-6	One of the overall management objectives for the Guadalupe Watershed under the FAHCE Agreement is to "restore and maintain healthy steelhead trout and salmon populations in the Guadalupe River watershed, by providing ... Suitable spawning and rearing habitat for salmon below Calero and Almaden Dams to their confluence with Lake Almaden ...." FAHCE Settlement Agreement, Section 6.6.1. To this end, Valley Water has committed to complete and implement (following regulatory approvals) an Alamitos Creek Facilities Plan that includes two parts:	Please see the response to commentF-001-NFMS-8.

ID	Issue Text	Response Text
	(A) Almaden Dam. The plan will evaluate alternatives to provide unimpeded passage, both upstream and downstream, at the existing dam and reservoir; eliminate the warming of water temperature in the reservoir; and eliminate or minimize the methylation of mercury in the sediments behind the dam. If a feasible alternative exists, the plan will recommend action, including design and construction schedules. The flow schedules stated above will be amended as appropriate on the basis of such removal or modification of Almaden Dam. (B) Almaden Lake. The plan will evaluate alternatives, including a bypass channel, to isolate Almaden Lake from Alamitos Creek and Guadalupe Creek, and to screen flow entering Almaden Lake to prevent entrainment and impingement of steelhead trout and salmon. If a feasible alternative exists, the plan will recommend action, including design and construction schedules. The plan will be completed no later than seven years and one day after the Effective Date. Id. at Section 6.6.2.1.3.3. We expect that Valley Water's implementation of the Proposed Project or one of the action alternatives will address the "Almaden Lake" part of the anticipated Alamitos Creek Facilities Plan. Accordingly, we request that Valley Water consider and select the alternative that best achieves the FAHCE objectives listed above. At a minimum, Valley Water should select an alternative that will not impede or preclude the restoration activities identified in the FAHCE Agreement. As Valley Water has proposed to implement this project outside of the FAHCE process as mitigation for construction of the Lower Berryessa flood control project, we understand that the extent to which the project satisfies Valley Water's commitments under the FAHCE Agreement will be addressed by the Initialing Parties at a future time.	
S-002-GCRCD-7	The GCRCD strongly encourages Valley Water to reconsider Option 8 as the Preferred Alternative for the reasons discussed above. Given the importance of this reach to the ecological function of the Guadalupe River, it is important to take advantage of the opportunity provided by the project to expand its spatial scope to consider the reach scale benefits and remedy the ecological impacts of the Alamitos Drop Structure. We realize that reconsidering the preferred Alternative could broaden the overall scope of the project and thus delay the project implementation, but given the expense of the current project, it would be cost-effective to also remedy the Alamitos Drop Structure as part of the same project. We are confident that GCRCD, the other resource agencies, and the NGOs would mobilize to assist the District in pursuing additional design, engineering, and funding assistance as needed. If Valley Water chooses not to revisit Option 8 as the Preferred Alternative, then we urge you to modify the proposed project to accommodate future removal of Alamitos Drop Structure and installation of an alternative diversion structure. Specifically, divide the reach into two phases: Almaden Lake Isolation and channel restoration (Phase 1), and Alamitos Drop Structure remediation (Phase 2). Then modify the proposed Almaden Lake site design to accommodate Phase 2 implementation at a not-to-distant time. This would include: • Installing an alternative diversion structure (e.g., infiltration gallery) as part of the Almaden Lake site design and mothball the new diversion structure for future use	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project. As noted in that response, the Project is designed in a way that would not preclude implementation of a future project addressing the Alamitos diversion dam.

ID	Issue Text	Response Text
	once Phase 2 is implemented (as was done on the lower Tuolumne River infiltration gallery). • Designing Phase 1 with respect to a natural grade based on extending the project longitudinal profile to upstream of Mazzone Road and downstream to Blossom Hill Road (or Hwy 85). This doesn't imply that there will be Phase 2 construction over this reach, just that the design incorporates this slope (i.e., a reach-scale design perspective). Functionally, this would result in the stream channel design in the Almaden Lake footprint have a steeper slope (some of which would be in the Alamitos Drop Structure backwater until Phase 2 is I implemented). • Work with the FAHCE agencies and NGO's to develop an ecologically friendly design for both Phases, and potentially collaborate on funding and/or design assistance for Phase 2. We request that you either revisit Option 8 as the Preferred Alternative, or revise the current Almaden Lake site design to accommodate a Phase 2 remediation and restoration of the Alamitos Drop Structure.	

ID	Issue Text	Response Text
S-003-RWQCB-1	**Comment 1a–Impacts to Federal and State Jurisdictional Wetlands and Other Waters** The proposed Project will result in a net permanent loss of 2.64 acres of jurisdictional wetlands or waters (including permanent loss of 15.44 acres of open waters but gain of 11.30 acres of riverine waters). The loss of surface area of jurisdictional waters results, in part, from to the conversion of open waters to riverine waters. We concur with the conclusion presented in the DEIR that filling the Lake to restore the Creek channel would provide a net environmental benefit based on the existing baseline. However, the DEIR discussion of the Project's benefits to aquatic habitat lack sufficient detail to clearly document that the Project's benefits to aquatic habitat will provide full mitigation for the Project's impacts to waters of the U.S. and of the State. Accordingly, the DEIR should be revised to include a more detailed discussion of the Project's net benefits to aquatic habitat.	The commenter suggests that the EIR discussion of the Project's benefits to aquatic habitat lack sufficient detail to support a conclusion of less than significant impact to impacts to waters of the U.S. and of the State. The District disagrees with commenter's statement the EIR discussion of the Project's benefits to aquatic habitat lack sufficient detail to clearly document that the Project's enhancement to water quality and beneficial uses in jurisdictional waters achieved by the Project would more than compensate for the Project's temporary construction impacts to waters of the U.S. and of the State. The EIR impact analysis does provide sufficient data to support this conclusion. To address the commenter's concern, a summary of benefits to waters of the U.S and the State has been added to the Project Description (see Section 2.D.1, Project Components). At the outset, it must be recognized that this is a creek restoration project, the primary purpose and objective of which is to convert a portion of Almaden Lake, which currently provides minimal aquatic functions, little or no aquatic habitat value in the existing condition, and contributes to a degradation of downstream water quality in Alamitos Creek, to high value, high functioning riparian stream habitat that will have beneficial effects for fisheries, habitat, fluvial processes, and water quality far beyond the boundaries of the restoration area. The benefits of this restoration project are consistent with those identified in the Regional Water Quality Control Board (RWQCB) Executive Officer Letter and the RWQCB Tech Memo. As stated in the Tech Memo, the Project "will also provide substantial benefits to Alamitos Creek, the Lake, and the Guadalupe River watershed" due to benefits from restoring a reach of Alamitos Creek and improving water quality in Almaden Lake and concludes that the Almaden Lake Project's 'improvements to water quality and beneficial uses in jurisdictional waters will extend far beyond the Lake Project's footprint' and that the Project provides 'a combination of water quality improvements within the Lake and restoration of riverine habitat that will provide adequate benefits to mitigate for impacts resulting from both the Lake Project, itself, and the Upper Berryessa Project.' As summarized on EIR page 1-2, and Impact 3.D-4, page 3.D- 36, the RWQCB concluded 'that the Almaden Lake Project would provide adequate enhancement to water quality and beneficial uses in jurisdictional waters to more than compensate for impacts from both the Almaden Lake Project and the Upper Berryessa Project.' These benefits led to the following RWQCB conclusions: "The [RWQCB's] analysis shows that the two projects together [i.e., the Upper Berryessa Creek Flood Risk Management Project, and the Almaden Lake Project} would result in a net gain in *function and value* [emphasis added] of jurisdictional waters, pursuant to San Francisco Bay Water Quality Control Plan (Basin Plan) section 4.23." RWQCB Executive Officer Letter, p. 1. "The temporary and permanent impacts in [SIC] the Lake Project will be offset by a net gain in functions and values of the impacted waters. In addition, the benefits of creek restoration and Lake enhancements will extend beyond the project footprint. This is because opening fish passage [by eliminating lake open water to restore a segment of Alamitos Creek] will benefit steelhead trout (Oncorhynchos mykiss) ("Steelhead"), a federally-listed endangered species, and Chinook salmon (Oncorhynchos tshawytscha), which

ID	Issue Text	Response Text
		both require unimpaired and unconstrained passage from freshwater to the ocean to complete their life history and to sustain local populations (NMFS, 2016). The Lake Project will also improve water quality in discharges into the Guadalupe River system because methymercury production in the lake will be minimized. With these improvements in aquatic *functions and values*, the Lake Project meets the No Net Loss Policy and Basin Plan requirements for mitigation of the impacts from both the Lake and Upper Berryessa projects." [Emphasis added]. Tech Memo, p. 2
	Comment 1B. This discussion should include significance thresholds for assessing Project benefits to habitat for native fish, including Central California Coast steelhead. For example, significance thresholds for temperature may include temperature impacts on the life stages of steelhead (e.g., redds, juvenile rearing habitat, and adult migration to spawning beds). Measures to assess net benefits to native fish populations, such as life cycle population censuses, should also be discussed to confirm the Projects benefits to aquatic habitat. We acknowledge that Table 3.D-2 includes an accounting of the net changes in acreage to the jurisdictional waters of the State, and identifies the changes as construction impacts that are less than significant. We recommend revising the DEIR to acknowledge this is a significant impact to jurisdictional waters under impact 3.K-3(iv)—Project would substantially alter the existing drainage pattern of the site or area in a manner which could impede or redirect flows, and to propose appropriate mitigation for the loss of waters. The revised DEIR should then provide a clear demonstration of the Project's net benefits to jurisdictional waters.	The commenter suggests that the EIR should discuss "significance thresholds" and "performance metrics" for assessing the beneficial impacts of the Project on fish habitat. CEQA does not require a lead agency to analyze beneficial impacts of a proposed project; however, the District provided a qualitative discussion of beneficial Project impacts in the DEIR. CEQA Guidelines Section 15126.2(a) indicates that an "EIR shall identify and focus on the significant environmental effects of the proposed project on the environment. In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the existing physical conditions in the affected area as they exist at the time the notice of preparation is published, or where no notice of preparation is published, at the time environmental analysis is commenced. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects." Section 3.D provides the rationale that the Project would result in less than significant impacts to aquatic habitat and, as concluded by the RWQCB in the 2018 Tech Memo, is anticipated to provide temperature as well as other water quality benefits for all life stages of steelhead. For example, the RWQCB Tech Memo concludes: "The restored creek channel reach channel reach is also expected to reduce a portion of the temperate barrier created by the current Lake and Alamitos flashboard dam system. Specifically, it may result in seasonally lower temperature between Winfield Road and Coleman Road. Warming will still occur during the seven to eight months of the year when the Alamitos Flashboard Dam is in place (April through December), but, based on temperature modeling conducted in 2004, it will be less than what is currently experienced (Corps, 2004). [The model] did predict slightly lower temperatures (i.e., about one-half of a degree suggesting a positive, albeit uncertain, temperature effect from the Lak Project beyond its limits." RWQCB Tech Memo Section D.1, p. 7. In light of temperature benefits predicted by modeling to be associated with the project, developing new significance thresholds or performance standards not only is not required by CEQA, but it is also unnecessary to further describe or understand the improved temperature conditions anticipated to result from the Almaden Lake Project. Similarly, Section 3.E provides the rationale that the Project would have less than significant construction impacts to native fish [with identified mitigation to address construction-related fisheries effects associated with draining of the lake prior to construction, through implementation of Mitigation Measure 3.E-1 (Native Fish Capture

ID	Issue Text	Response Text
		and Relocation)] and ultimately will benefit all life stages of native fish by improving habitat facilitating migration and improving water quality. The commenter suggests that the EIR should be revised to conclude that the Project would substantially alter the existing drainage pattern of the site in a manner which could impede or redirect flows and should propose mitigation for loss of waters. As noted in the comment, the EIR concluded Impact 3.K-3 (substantial changes to drainage patters) to be significant but mitigated to a less than significant level. However, it should be understood that the primary alteration in the existing drainage patterns associated with the Project is an alteration that is required to implement the restoration of stream flows and hydrology in Alamitos Creek for purposes of improving riverine fluvial processes and riparian habitat, fish migration, water quality, and overall aquatic functions and value. More specifically, the CEQA hydrology threshold of significance indicates a significant adverse hydrological impact occurs when the course of a stream or river is altered "in a manner which could: (i) result in substantial erosion or siltation offsite; (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite; (ii) create or contribute to runoff water which would exceed the capacity of existing planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or (iv) impede or redirect flood flows." As set forth in the analysis of that section, none of those adverse effects are anticipated to result from implementation of the proposed project, so it would be inappropriate to conclude that there is a significant adverse hydrology effect. As analyzed in the EIR, the only adverse impact to drainage patterns that might occur is associated with Project construction, which would temporarily close and drain Almaden Lake, and creek flows would be temporarily routed behind sheet piles. Unless properly designed, temporary constriction of creek flows could result in accidental and potentially hazardous flooding during a major storm event. As described under Mitigation Measure 3.K-3, design and implementation of a sheet pile system that would adequately convey creek water during major storm events would reduce the impact to a less-than-significant level.
	Comment 1C. In addition, although this is not strictly a CEQA review requirement, a Project must meet the California Wetlands Conservation Policy, also called the no net loss policy, for the Water Board to authorize WQC/WDRs for the Project. The Water Board adopted U.S. Environmental Protection Agency's (EPA's) Clean Water Act (CWA) section 404(b)(1) Guidelines (Guidelines) to evaluate whether a project, as proposed, constitutes the least environmentally damaging practicable alternative (LEDPA) that will achieve the basic project purpose. A project complies with the Guidelines if the following can be demonstrated, in order of sequence: 1. First, there is no practicable alternative to the proposed Project that would avoid or result in less adverse impacts to aquatic resources. Potential practicable alternatives include, but are not limited to, alternative available locations, modified designs, and/or reductions in size, configuration, or density; 2. Second, all practicable steps have been taken to minimize unavoidable adverse impacts to aquatic resources; and 3. Finally, after impacts have been avoided and minimized to the maximum extent practicable, compensatory mitigation for unavoidable loss of acreage, beneficial uses and aquatic resource functions is provided.	Executive Order W-59-93 establishes the California Wetlands Conservation Policy, also called the "No Net Loss Policy." The No Net Loss Policy provides that all state agencies, including the water boards, are to exercise their authority to attain three (3) objectives with respect to wetlands, as follows: "It is hereby declared to be the policy of the State of California that its Comprehensive Wetlands Policy rests on three primary objectives: 1) To ensure no overall net loss and long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property. 2) To reduce procedural complexity in the administration of State and Federal wetlands conservation programs. 3) To encourage partnerships to make restoration, landowner incentive programs, and cooperative planning efforts the primary focus of wetlands conservation." It is important to note that encouraging and incentivizing cooperative planning efforts for restoration of wetlands is a co-equal goal with attaining no net loss, and a long-term

ID	Issue Text	Response Text
	Once a project proponent has demonstrated that the proposed Project design is the LEDPA (e.g., that fill has been avoided and minimized to the maximum extent practicable), we will require appropriate compensatory mitigation for both temporary and permanent impacts to waters of the State. We will evaluate both the project and the proposed mitigation together to ensure that there will be no net loss of acreage and no net loss of functions. The accounting of losses and benefits to waters of the State could be used to inform the LEDPA analysis. The proposed Project does not yet represent the LEDPA given that it results in a net loss of waters, and the discussion of Project benefits to aquatic habitat in the DEIR is not yet sufficient to establish that the Project will have a net benefit to aquatic habitat in jurisdictional waters. We recommend the DEIR be revised to provide a more detailed assessment of the Project's benefits to aquatic habitat, including performance metrics to document the Project's improvements to aquatic habitat. We encourage Valley Water to coordinate with the Water Board, the Californian Department of Fish and Wildlife, and the National Marine Fisheries Service, which is the federal agency responsible for protection of steelhead under the Federal ESA, to develop appropriate metrics assessing the Project's benefits to aquatic habitat; this coordination should expedite the permitting stage of the Project.	net gain not only with respect to the quantity, but equally or more importantly, in the *quality, permanence and values* of wetlands in the state. The RWQCB adopted implementation provisions for the No Net Loss Policy into its Basin Plan. See, e.g., Basin Plan Sections 2.2.3 and 4.23. In light of these co-equal goals, it is incumbent on the RWQCB to encourage an incentivize the proposed restoration project, as the RWQCB recognized in preparing its evaluation in the 2018 RWQCB Executive Officer Letter and the RWQCB Tech Memo. Further, under the Basin Plan implementation provisions and the provisions of the Statewide Water Quality Control Policy for Inland Surface Waters, Enclosed Bays and Estuaries (ISWEBE), while Almaden Lake is clearly a surface water of the state subject to RWQCB jurisdiction, it is not a "wetland" surface water. The Basin Plan says that "wetland" surface waters are identified as follows: "The Water Board will, in general, rely on the federal manual for wetland delineation in the Region when issuing Clean Water Act Section 401 water quality certifications (U.S. Army Corps of Engineers (Corps) Wetlands Delineation Manual, 1987). In the rare cases where the U.S. EPA and Corps guidelines disagree on the boundaries for federal jurisdictional wetlands, the Water Board will rely on the wetlands delineation made by the U.S. EPA or the California Department of Fish and Game (CDFG)." Basin Plan § 2.2.3 p. 2-10 While those technical methodologies define lakes and open water as jurisdictional aquatic features, they do not define lake and open water habitats as "wetlands." Further, as set forth in the Basin Plan, "The Water Board recognizes that wetlands frequently include areas commonly referred to as saltwater marshes, freshwater marshes, open or closed brackish water marshes, mudflats, sandflats, unvegetated seasonally ponded areas, vegetated shallows, sloughs, wet meadows, playa lakes, natural ponds, vernal pools, diked baylands, seasonal wetlands, floodplains, and riparian woodlands." Basin Plan § 2.2.3 p. 2-10. Almaden Lake is not any of those types of aquatic features, in that it is a lake resulting from historical anthropogenic channel modifications and mining. Similarly, under the recently effective statewide State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State adopted by the State Water Resources Control Board (April 2, 2019) (WOTS Regulations) as an amendment to ISWEBE, lake open water features are waters of the state, but do not qualify as wetlands, which are defined as: "An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation." WOTS Regulations § II. The WOTS regulations further specify:

ID	Issue Text	Response Text
		"A delineation of any wetland areas potentially impacted by the project that are not delineated in a final aquatic resource report verified by the Corps shall be performed using the methods described in the three federal documents listed below (collectively referred to as "1987 Manual and Supplements") to determine whether the area meets the state definition of a wetland as defined above. As described in the 1987 Manual and Supplements, an area "lacks vegetation" if it has less than 5 percent areal coverage of plants at the peak of the growing season. The methods shall be modified only to allow for the fact that the lack of vegetation does not preclude the determination of such an area that meets the definition of wetland." The 1987 Manual and Supplements do not define open water lake habitat as wetlands, but rather as other jurisdictional waters. As a result, for purposes of determining solely whether there is a net loss in the "quantity" of wetlands, a loss of Almaden Lake open water habitat does not qualify as a loss of "wetland" habitat. This is particularly important in this situation because low value open water acreage will be replaced with high value streambed and riparian wetland habitat. A conversion of low function and value non-wetland open water habitat as compared to high aquatic function and value linear footage of streambed and riparian habitat cannot be compared considering only the change in acreage of the two very different habitat types, which leads to an even more important point regarding application of the No Net Loss Policy to this proposed restoration project. Regardless of whether Almaden Lake open water should be identified or delineated as wetlands, even if the RWQCB considers such habitat to constitute "wetlands" instead of non-wetland surface waters contrary to regulatory definitions and technical methodologies for identifying wetland aquatic features, as acknowledged by the RWQCB Executive Officer Letter and RWQCB Tech Memo, the application of the No Net Loss Policy does not hinge solely on the quantity of habitat that will be impacted versus the quantity restored. Instead, as set forth in the RWQCB Tech Memo, § D: "The Lake Project will permanently impact 16 acres of open water habitat in Almaden Lake by placing fill in 5 acres of the Lake to construct a levee and converting 11 acres of open water in the Lake back to creek and riparian habitat. The Lake Project will also temporarily impact the other 16 acres of open water in the Lake by recontouring and capping the Lake bed and shoreline. However, the project will also provide substantial benefits to Alamitos Creek, the Lake, and the Guadalupe River watershed, as explained below in more detail: ...The Lake Project will restore 11 acres and 1,700 linear feet of Alamitos Creek between Winfield Road and Coleman Road by separating Almaden Lake from Alamitos Creek and reestablishing a low-flow channel with adjacent riparian habitat. This will improve fluvial processes, such as transport of sediment and organic material, including large and small woody debris, and fish passage for salmonids in the reach (FISRWG, 1998; SCVWD, 2017a). Natural sediment dynamics will facilitate the development of habitat features that support native fish, including well-oxygenated water, diverse structure with pools and riffles for rearing, and potential spawning beds depending on gravel sizes.

ID	Issue Text	Response Text
		Because the Lake will no longer intercept flow, attraction flows for up-migrating salmonid and pulse flows to facilitate juvenile out-migration will be improved from January through March each year, when the flashboards at the Alamitos Flashboard Dam are not impounding the creek. Moreover, migration through the restored reach will also have significantly less predation pressure from non-native fish (SCVWD, 2017a). These habitat improvements will improve the COLD, RARE, MIGR, SPWN, and WILD beneficial uses, which translates to significant lifts in function and value of Alamitos Creek. … The Lake Project will also directly benefit water quality in the Lake by capping the Lake substrate with a two-foot thick impermeable layer and replumbing the water supply to come from imported sources rather than Alamitos Creek. The Guadalupe River TMDL Staff Report (Water Board, 2008a) acknowledges that other water sources for the Lake may also contain mercury but at significantly lower concentrations relative to the levels in Alamitos Creek. This, along with the reduction in anoxic zones, will result in less methylmercury production within the Lake and a corresponding improvement to water quality discharges to the Guadalupe River system downstream of the Lake. . .. The reductions in methylmercury production and concentrations will improve the REC-1, WARM, and WILD beneficial uses both in the Lake and downstream of the Lake in Guadalupe Creek and the Guadalupe River. …Thus, the water quality benefits from enhancing the Lake will extend well beyond the Lake's footprint with water quality as well as the District's ongoing maintenance activities and funding for maintenance. The Lake Project will also increase riparian trees and wetland and riparian vegetation along the new lake and stream margins. This will improve habitat functions and value by providing shade and enhancing nutrient cycling and pollutant filtration functions. This is expected to reduce algal blooms and improve water quality, enhancing recreational opportunities an overall more inviting waterscape for visitors, thereby improving both REC-1 and REC-2 beneficial uses." As described in the RWQCB Executive Officer Letter, pp. 1-2: "The analysis shows that the two projects together [Upper Berryessa and Almaden Lake Restoration] would result ***in a net gain in function and value of jurisdictional water, pursuant to the San Francisco Bay Water Quality Control Plan (Basin Plan) section 4.23.*** We found that the two projects would result in restoration and creation of 11,027 linear feet (18.4 acres) of jurisdiction waters, ***in addition to enhancements to roughly 150,000 linear feet of Alamitos Creek and other Guadalupe River watershed streams, more than compensating for the temporary and permanent impacts of the Upper Berryessa Creek and Almaden Lake projects."*** **[Emphasis Added].** Even with more advanced design information, the Lake Project impacts are still generally the same as when the restoration project was evaluated in 2018. The Lake Project would permanently impact open water habitat in Almaden Lake by placing fill in

ID	Issue Text	Response Text
		the Lake to construct a levee and create islands to enhance diversity of habitat types; and converting open water in the Lake back to creek and riparian habitat. The Lake Project would also temporarily impact the open water habitat to reduce lake depth and cap sediments to improve habitat and water quality. Similarly, the Project is still generally predicted to result in the same benefits, including creation of jurisdictional waters, and improvement in fluvial, hydrogeomorphic, and water quality functions and values that extend far downstream of the restored Alamitos Creek segment. As described in the RWQCB Tech memo, "[t]o evaluate whether the Lake Project would satisfy the mitigation requirement for the Upper Berryessa Project, we first quantif[y] the impacts and benefits of the Lake Project, … then combin[e] that analysis with the impacts and other information . . .to determine whether no net loss in jurisdictional waters will result from construction of both the Upper Berryessa Project and the Lake Project." Application of the No Net Loss policy requires consideration of the impacts of a project on functions and values as the cornerstone of any evaluation of a proposed projects effects, and even more prominently than evaluation of the relative acreage impacts to low value open water habitat as compared to riparian habitat lineal footage increases, which units of measurement cannot be compared on the basis of area alone. When that holistic analysis is performed, the restoration project fully complies with the No Net Loss Policy, and it is incumbent on the RWQCB to facilitate the restoration project pursuant to that Policy. Regarding analysis of alternatives, as discussed in EIR Chapter 4, Alternatives, the District considered several alternate designs to meet the Project objectives. The Project would avoid or result in less adverse impacts to aquatic resources than other options considered at the Project site. Further, the project would result in adverse impacts on only low function and value aquatic features (in this case low quality open water lake habitat), while the project provides for a substantial increase in high function and value streambed and riparian habitat and improves the remaining open water lake habitat. As with the No Net Loss policy, the 404(b)(1) guidelines require assessment and consideration of the functions and values of habitat impacted versus habitat created, and the analysis does not turn solely on an assessment and comparison of impact versus restoration acreage. 40 CFR 230.11. Specifically, two alternatives for the restoration project were evaluated and considered in comparison to the proposed restoration project. Any alternative to restore Alamitos Creek to a continuous riverine and riparian conditions necessitates fill to separate the creek from the lake. The two alternatives involve development of a new 5-acre lake west of Alamitos Creek (Alternative 2) or a new 5-acre wetland west of Alamitos Creek (Option 7), but both options would substantially reduce the footprint of Alamitos Creek, resulting in a narrower, more channelized creek system that would not be beneficial to aquatic resources. The Project would restore Alamitos Creek in an approximately 10-acre area of the Project site, creating a 210- to 420-foot wide flood channel that incorporates a riffle-pool-run pattern similar to the Alamitos Creek channel section immediately upstream of the Project area. The District has incorporated practicable steps to minimize unavoidable adverse impacts to aquatic resources, and the EIR includes mitigation measures (described above) that would include implementing a native fish capture and relocation plan to minimize adverse impacts on native fish in

ID	Issue Text	Response Text
		the Project area, monitoring and managing the water quality of lake discharges to Alamitos Creek during construction, and siting of the sheet pile system during construction to ensure sufficient capacity would be available in the temporary creek system to convey up to a 100-year storm event. Thus, the project, as proposed, does meet the LEDPA requirements prescribed in the federal regulations. Finally, as the RWCQB concluded in its August 8, 2018 technical memorandum, the Almaden Lake Improvement Project would provide adequate enhancement to water quality and beneficial uses in jurisdictional waters to more than compensate for impacts from both the Almaden Lake Project and the Upper Berryessa Project. In addition, the RWQCB's August 8, 2018 memorandum indicates that the RWQCB would accept the Almaden Lake Project as mitigation to comply with the Upper Berryessa Project 401 Certification/Waste Discharge Requirements. The District plans to submit a Mitigation and Monitoring Plan (MMP) for the Upper Berryessa Project that would provide the Almaden Lake Project as the mitigation project. Because the Almaden Lake Project is now mitigation for the Upper Berryessa Project pursuant to the 401 Certification/Waste Discharge Requirements, the LEDPA determination is arguably irrelevant. The RWQCB's 2018 analysis of the project and the description of benefits in the EIR, when considered with other elements of project practicability, support the conclusion that the proposed Project is the LEDPA and that it will have long-term and widespread net benefits to aquatic habitat.
S-003-RWQCB-2	**Comment 2–Clarification of Water Operations and Discharges from Lake to Creek** The Project is grounded in water operations for delivering water to the Los Alamitos Percolation Pond (Pond) for groundwater recharge, coupled with continuous flow-through in the Lake to minimize stagnation and concentration of pollutants such as nutrients and bacteria, and to sustain dissolved oxygen at levels to suppress methylmercury production in the Lake. The Project's new pipelines and a pump station include transferring Lake water to the Creek when the Pond is unavailable to receive flow. However, the DEIR provided little information on transferring Lake water to the Creek, such as the anticipated frequency, duration, and flow rate (except for the pipeline size and pump station capacity). The DEIR should be revised with such details to clarify the potential for Lake discharges to the Creek, and should identify the discharge of Lake water to the Creek as a significant impact to Hydrology and Water Quality, impact 3.K-1, The Project would violate water quality standards or waste discharge requirements, conflict with or obstruct implementation of the Basin Plan, or otherwise substantially degrade surface or groundwater quality. This is because the Lake water may be unsuitable for discharging to the Creek due to the same factors invoking the flow-through design, such as (but not limited to) elevated levels of bacteria, nutrients, and mercury. Discharges of Lake water may also be unsuitably warm and with dissolved oxygen levels that would not support the cold water habitat beneficial use of Alamitos Creek. In addition, Lake discharges may contain non-native biota that bypass screens. We recommend the DEIR include avoidance and minimization alternatives to discharging Lake water to the Creek, such as recirculating the Lake water within the Lake instead of discharging it to the Creek. Otherwise, a discharge permit separate from WDRs authorizing construction of the	As stated in the EIR Project Description (page 2-16), the District plans to pump water from Almaden Lake to Alamitos Percolation Pond/Los Capitancillos Percolation Ponds, where it would be used for groundwater recharge. Within the lake, the District would implement features to maintain water quality such as the SolarBees, or other features as appropriate. Operational discharges to the creek (described on page 2-19) would only be implemented in the event that capacity at the Ponds is not available. If the ponds are not available, water would be retained in the Lake as long as possible, and would only be discharged to the Creek if Lake water quality begins to decline due to the lack of discharge. The lake discharge pump is designed to draw lake water from deeper levels, to minimize temperature differences between the lake and discharge location. Because creek discharges are not planned or intended, the District does not have information on anticipated frequency, duration, or flow rate. CEQA compares the impacts of the Project to the existing condition (baseline). Section 15125(a) of the CEQA Guidelines states "This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." The EIR, in considering whether operational lake discharges would result in a significant water quality impact (Impact 3.K-1), appropriately compared the existing baseline in which there is no separation between the lake and the creek, and the future condition under the Project where lake water would be drained, the lake bottom would be recontoured and capped, and then refilled with imported water before being pumped to Alamitos Percolation Pond. Thus, water quality would be improved as compared to existing conditions. The occasional release of lake water into the creek would be an improvement over the current condition in which the lake continuously discharges to the creek by substantially reducing the time and volume of lake water discharged to the lake, and would not constitute a significant adverse impact pursuant to CEQA. Thus, water quality impacts during project operations would be less than significant.

ID	Issue Text	Response Text
	Project may be required. We urge Valley Water to consult with the Water Board to address this issue before finalizing the EIR.	
S-003-RWQCB-3	**Comment 3–Sediment Reuse and Imported Soil Fill** The DEIR should include a soil monitoring plan to determine the appropriate beneficial reuse or disposal options for any soil excavated in the Project site. The Water Board requires any soil fill to meet the criteria in the Water Board May 2000 staff report, Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines, or the most current revised version. Modifications to these procedures may be approved on a case by case basis, pending Valley Water's ability to demonstrate that the soil proposed for reuse and any imported soil fill material is unlikely to adversely impact beneficial uses of the jurisdictional wetlands and waters in the Project. For example, the DEIR indicates that beneficial reuse of excavated soil would be based on hazardous waste criteria or environmental screening level (ESL) criteria (DEIR pp. 2-38 – 2-40), which may be acceptable depending on the circumstances such as soil sampling frequencies. Finally, the DEIR, Appendix B, Table B-2 states an assumption that 80 percent of excavated sediment would be reused onsite, and 20 percent would need to be hauled offsite for disposal. This assumption must be verified with the appropriate analyses.	As discussed on EIR page 2-40, the District would comply with the current version of the San Francisco Bay RWQCB's guidance on environmental screening levels (ESLs) for potentially hazardous soils, including any monitoring requirements, and would appropriately dispose of excavated soils that exceed ESLs. Further, as discussed in Impact 3.J-3 (significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of contaminated soil), the sediment management activities proposed under the Project would be required to comply with various hazardous materials regulations designed to ensure that hazardous waste, including contaminated sediment, would be excavated, transported, and disposed of in a safe manner to protect worker safety, and to reduce the potential for a release of hazardous materials to the environment (see EIR Section 3.J.2, Regulatory Setting). Cal-OSHA would require that construction workers be trained to properly handle hazardous waste. RCRA and HWCA would regulate the management and disposal of hazardous waste. The DOT Hazardous Materials Transportation Act and the Federal Motor Carrier Safety Administration would regulate the transportation of hazardous waste. In addition, and as discussed in EIR Chapter 2, Project Description, the District has incorporated Avoidance and Minimization Measures into the Project, provided in the District's BMP Handbook. The measures relevant to hazardous materials are listed above in the section titled Avoidance and Minimization Measures Incorporated into the Project, and include District BMPs HM-9 and HM-11. District BMP HM-9, Ensure Proper Hazardous Materials Management, would include worker training, minimizing chemical contact with precipitation, ensuring hazardous materials will not contact soil or be allowed to enter surface waters or the storm drainage system, and covering hazardous waste disposal containers when not in use. District BMP HM-11, Ensure Worker Safety in Areas with High Mercury Levels, would ensure worker safety is protected in areas with elevated mercury concentrations in exposed surfaces by requiring personal protective equipment during project construction to maintain exposure below levels established by Cal/OSHA. The listed specific measures would minimize the impact of hazardous materials releases by ensuring safe containment and handling to prevent accidental release or exposure, providing appropriate worker training, and requiring personal protective equipment during project construction. Compliance with regulations and the District's Avoidance and Minimization Measures described above would ensure safe containment and handling to prevent accidental release or exposure, require personal protective equipment for workers during Project construction, develop and implement a Health and Safety Plan and a Soil Management Plan, and provide appropriate worker training. This impact is considered less than significant. Regarding the EIR Appendix B assumption that up to 80 percent of the excavated sediment could be reused on site, as discussed on EIR page 2-40, based on soil test results of 4 samples taken at depths ranging from 3 to 10 feet below the top of sediment within the bed of Almaden Lake and 16 soil samples taken at depths ranging from 0 to 5 feet along the shoreline in December 2015, shoreline soils would have no restrictions with respect to on-site reuse or disposal under current ESLs. Based on testing, some lake bottom sediment could be suitable for on-site reuse for

ID	Issue Text	Response Text
		re-contouring Almaden Lake or reconfiguring the channel of Alamitos Creek, or may require disposal offsite at a non-hazardous Class III landfill consistent with California thresholds for hazardous waste classification. Based on this soil testing, an estimate of 80 percent reuse was assumed and is reasonable. Please see Table 2-3, Project Construction, Approximate Duration, Crew Size, Equipment, and Approximate Cut and Fill Volumes. As noted in Table 2-3, footnote a, volumes listed on Table 2-3 are approximate and will be refined during final design. However, volumes listed on Table 2-3 represent the maximum that could be expected based on available information.
S-003-RWQCB-4	**Comment 4–Lake Dewatering and Creek Bypass Discharges** To construct the Project, the Lake would be completely drained. In addition, Alamitos Creek flow would be rerouted around the Project reach and discharged downstream from the lake, near the footbridge and Coleman Road overcrossing of the Creek. A complete dewatering and diversion plan will be required as part of the application for a WQC/WDRs, and we encourage Valley Water to include these in the EIR to ensure the considerations for staging, storage tanks, pipelines, pumps, wells, or other elements have been fully evaluated site conditions. The plan must include elements to contain, monitor, and treat the water, as appropriate, to prevent adverse water quality impacts. The dewatering and diversion plans will also need to include diagrams of alignments and locations of piping, cofferdams, pumps, and flow dissipaters, which need to be sized correctly for the anticipated flows to be managed. In addition, the plans must include a discharge monitoring plan to determine whether the dewatering and diversion flows meet the Basin Plan receiving water quality objectives, particularly for turbidity, dissolved oxygen, temperature, and pH. In addition, the plans must include continuation of the mercury TMDL water quality monitoring program until the Lake has been fully dewatered, and propose appropriate monitoring for total mercury and methylmercury associated with potential discharges during construction.	The District acknowledges that a dewatering and diversion plan that provides more detail than required by CEQA for the EIR would be required as part of the RWQCB permitting process. The District plans to submit a dewatering plan during permitting; however, design has not advanced enough to provide it now. All dewatering activities could take place within the Project footprint and staging areas identified in the Draft EIR. For additional responses on the dewatering plan, please see response to comment S-001-CDFW-4. The location of proposed staging areas is identified in the EIR Project Description (See EIR Section 3.E.4, Staging Areas and Access, and include areas include Almaden Lake, the southwestern lawn area of Almaden Lake Park, and the District's Winfield Warehouse (EIR Figure 2-2). Further, EIR Figure 2-1 indicates the overall project study area and anticipated maximum area of disturbance. Project associated staging, pipelines, pumps, and other elements would be located within that study area. The project does not include wells or permanent storage tanks. The EIR includes evaluation of the site conditions, as well as the construction and operation of the project within that study area. The EIR describes the shallow sediment dewatering process on pages 2-37 and 2-38 of the Project Description. Impact 3.K-1 discloses that dewatering could release sediment, mercury, and other potential water quality pollutants to downstream areas resulting in downstream water quality degradation (page 3.K-21). The District would implement Mitigation Measure 3.K-1 (Monitor and Manage the Quality of Lake Discharges to the Creek) to minimize these effects by ensuring that sediment and/or mercury-laden sediment would not be discharged to surface waters (page 3.K-25).
S-003-RWQCB-5	**Comment 5–Sediment Transport** DEIR should include a detailed maintenance plan to explain how sediment is transported through the restored creek reach, and whether the Project will result in sediment deposition within the Project footprint, downstream along the reach from Coleman Avenue to the Alamitos flashboard dam, and further downstream of the dam. During the interagency meeting of January 22, 2020, NMFS voiced concerns that sediment accumulation is already a problem at the mouth of Guadalupe Creek, which is close to the downstream boundary of the Project, and that the Project would exacerbate that problem. In addition, the Project design accounts for an instream quarry pit close to the downstream boundary being readily filled in, suggesting the area will remain a depositional zone. In fact, the DEIR indicates 5,000 cubic yards of sediment will be removed once every 10 years from the Project reach. Please revise the DEIR to fully characterize this apparent indirect impact of the Project.	The Draft EIR Project Description provides a sufficient level of detail on sedimentation to disclose the Project's likely impacts and a detailed maintenance plan is not essential for this analysis. As described in Impact 3.K-1, the restored creek channel would be designed to have a stable geomorphic channel with a riffle-pool-run pattern, designed to neither aggrade nor degrade for the entire length of the restored creek section. Channel design would be informed by two technical analyses developed by the District: Alamitos Creek Draft Sediment Transport Technical Memorandum (2017) and Alamitos Creek Bankfull Discharge Technical Memorandum (2016) (page 3.K-24). The model described in the Alamitos Creek Draft Sediment Transport Technical Memorandum (2017) indicates that the sediment would move through the project reach and drop into the pit downstream of Coleman Road (downstream limit of the project). This pit will be filled up with sediment and eventually cease to exist. This pit is estimated to be able to contain approximately 4,000 cubic yards of material. In

ID	Issue Text	Response Text
		addition, some sediment will accumulate within the Project reach up to a natural equilibrium, then sediment will be conveyed downstream similar to the upstream reaches of Alamitos Creek. Because the channel is being restored and separated from the lake, the lake would no longer act as a sediment sink and the new channel would promote sediment transport in the Guadalupe Watershed. Based on bathymetric survey data from 2011, 2017, and 2019, the project team estimates that the new creek channel could convey up to roughly 1,000 CY of sediment annually on average after the restored channel reaches a natural equilibrium. This is a preliminary estimate and the project hydraulic models and associated sediment transport technical memorandum would be updated should the Project be approved by the District Board of Directors and design progress. The project team's preliminary estimates show that no sediment removal would be necessary in the future from the restored creek channel. Once the pool downstream of Coleman Road fills up and the restored channel reaches equilibrium in terms of sediment deposition, the District would remove sediment as a regular maintenance action at the confluence of Alamitos and Guadalupe Creeks, downstream of the newly restored channel. The District already conducts periodic sediment removal under the Stream Maintenance Program at the confluence of Alamitos and Guadalupe Creeks to remove mercury-laden sediments from the system before they reach San Francisco Bay where they can be harmful. Other clean sediment removed from this area could be beneficially reused for other projects such as gravel augmentation and ecotone construction. The frequency and amount of sediment removal necessary will be finalized in the requested detailed maintenance plan that will be submitted to the San Francisco Bay Regional Water Quality Control Board as a part of the permitting process.
S-003-RWQCB-6	**Comment 6–Legacy Mercury Contamination** Numerous creeks and reservoirs in the Guadalupe River watershed, including Alamitos Creek and Almaden Lake, are impaired by mercury due to legacy mining activities. As a result, the Water Board developed a watershed-wide mercury management strategy under the Guadalupe River Watershed Total Maximum Daily Load (TMDL) implementation plan (Basin Plan, section 7.7.1). The DEIR should be revised to provide details on changes to mercury fate and transport anticipated by implementing the Project, and how compliance with the TMDL would be affected by the Project. To address this, we recommend the DEIR include the following assessments and mitigation measures and to include them as mitigation for the Hazards and Hazardous Materials impacts: a. *Clay Cap*. The Project includes constructing a clay cap on the lake bed to prevent migration of mercury and methylmercury into the lake's bottom substrate and water column. However, the DEIR indicates the clay cap will be 2.5 feet thick, while the Geotechnical investigation report (Appendix D) states that it would be no less than 5 feet thick, and would be 10 feet thick at the levee toe. Please revise the DEIR to explain this discrepancy in the clay cap thickness, and provide more details sufficient to show that the clay cap would be effective in preventing mercury and methylmercury from migrating upward through the cap.	As described in Impact 3.K-1, the Project includes several measures that would improve mercury-related water quality issues in the Project area, including separating the lake and Alamitos Creek, using imported water as a water source for the lake, removing and capping mercury-laden sediments in the lake bed, recontouring the lake bottom to promote circulation within the lake, and increasing lake water circulation ((page 3.K-21). As disclosed in the EIR, these activities are expected to substantially reduce mercury and methylmercury concentrations in both lake bottom sediments and in the water column of Almaden Lake, in comparison to existing conditions (page 3.K-22). In the RWQCB's August 6, 2018 technical memorandum regarding the Project, the RWQCB stated "The Lake Project will also significantly enhance the Lake's water quality and reduce methylmercury concentrations discharged from the Lake into the Guadalupe River system" and concluded that "We anticipate that the Lake Project will expedite delisting of the Lake as impaired for mercury under the CWA section 303(d) which would partially meet the goals of the Guadalupe River Watershed TMDL plan." EIR page 3.K-22, paragraph 1, has been amended to provide additional details explaining why the clay cap would be effective in preventing upward migration of mercury/methylmercury:

ID	Issue Text	Response Text
	b. *Dust evasion of dewatered reservoir*. The DEIR should address the potential for mercury-laden sediment fines to be picked up by wind during construction and pose a risk to workers, park users, nearby residents, and biota in the area. c. *Monitoring to capture Project's effects on methylmecury levels*. Monitoring lake concentrations of mercury and methylmercury will need to continue to evaluate compliance with the TMDL. d. *Non-native fish prevention*. The TMDL has mercury objectives based on fish tissue concentrations. The DEIR should include a plan to prevent introduction of non-native fish into the Lake after being re-filled. However, we recognize that non-native fish could be reintroduced by fish anglers, and by other means such as unwanted pet fish being released into the Lake. Therefore, we suggest the DEIR to include alternatives for an intensive public education and outreach effort to dissuade these practices.	Elevated levels of mercury-laden sediment would not be delivered to the lake from the Almaden Valley Pipeline. The lake currently receives water and sediment from Alamitos Creek which headwaters included areas of mercury mining and continue to be impacted by legacy mercury. Almaden Valley Pipeline receives water primarily from San Luis Reservoir and Calero Reservoir which have much lighter mercury loads. ~~and~~ The existing mercury-containing sediments in the lakebed would be buried below a clay layer to sufficient depth that they would no longer have potential to intermix with lake bottom waters, lake bottom sediments, or associated microbial communities. Cal Engineering & Geology (CE&G) completed a geotechnical investigation report dated 30 April 2015 (included as Appendix D), for the District for the design of the planned improvements at Almaden Lake. The scope in preparing the 2015 report included drilling and sampling four geotechnical borings along the southern perimeter of the lake, drilling and sampling three geotechnical borings within the western portion of the lake, and laboratory testing of selected samples. Analysis completed as part of the investigation included, seepage, short and long-term slope stability, rapid drawdown, seismic stability, and settlement. Analyses were completed in general conformance with guidelines provided in U.S. Army Corp of Engineers (USACE) engineering manual regarding the design and construction of levees (EM-1110-2-1913). An additional letter, Supplemental Seepage Analysis for Sheet Piles dated 7 April 2017, with geotechnical findings and recommendations was provided as well. Since the 2015 report, overall project design progressed to the 30% design level except for geotechnical-specific design aspects of the project. To supplement the District's 30% design work, the District requested CE&G to provide coordinated design services related to the geotechnical aspects of the project, including soil cement treatment of the soft, organic-laden lake sediments and fill placement, related staging and processing needs, geotechnical specifications, and cost estimating. As a result, CE&G prepared a draft geotechnical stabilization memorandum dated 20 September 2019 that summarizes the geotechnical aspects related to soil cement treatment and soil stabilization that will be required prior to fill placement. This memorandum has been added to Appendix D of the FEIR. Among the many 30% design requirements for shallow soil mixing of the lake sediments in the 2019 draft memorandum, the memorandum includes the following requirements for mixing depth: "Soil mixing should be to depths of a minimum of 8 feet, or until alluvial soils are encountered, underneath the new levee, the filled in portion of the lake, and the new islands. If lake sediments are present under the 8 feet of treated soil, settlement of the soils is estimated to range from 3 to 10 inches. If the full depth of the lake sediments is treated, settlement is estimated to be less than 1 inch. This settlement estimate is for consolidation of the lake sediments and doesn't include consolidation of the fill materials. Where the lake will remain, it is anticipated a minimum 3-foot cap of soil is to be placed on top of the lake sediments to create a barrier between them and the lake water. To prevent cracking, we recommend a minimum depth of 3 feet of soil mixing to limit differential settlement that may lead to cracking of the soil cap." The FEIR Project Description has been updated to reflect the recommendation for a minimum 3-foot clay cap. As the design progresses and as new data about lake

ID	Issue Text	Response Text
		sediments are gathered, the recommended cap thickness may be revised accordingly. Regarding construction-related fugitive dust, the Bay Area Air Quality Management District (BAAQMD) considers implementation of its recommended mitigation measures for fugitive dust sufficient to ensure that construction-related fugitive dust is reduced to a less than significant level. Therefore, the BAAQMD recommends that analyses focus on implementation of dust control measures (EIR page 3.C-13). Impact 3.C-2 provides an analysis of construction-related fugitive dust, and implementation of Mitigation Measure 3.C-1b (BAAQMD Basic Construction Measures) would reduce the impact associated with fugitive dust emissions to a less than significant level by requiring implementation of BAAQMD's applicable recommended fugitive dust control measures (page 3.C-22). These measures include watering exposed surfaces, covering haul trucks, using wet power vacuum street sweepers, and posting signage with contact information for dust complaints (EIR page 3.C-20). The District currently conducts monitoring for mercury and methylmercury in compliance with the Guadalupe River Watershed TMDL and installs signage discouraging the public from releasing fish into the lake and other District facilities. These efforts would continue. EIR page 2-46, paragraph 8, has been amended to state: **Lake:** Almaden Lake water quality would continue to be monitored monthly to bi-monthly by District staff for mercury and methylmercury concentrations in compliance with the Guadalupe River Watershed TMDL. The District would continue to display public education signage discouraging the release of non-native fish into the Lake. Other maintenance activities associated with Almaden Lake would include maintenance of the SolarBees. The City would continue to collect litter and perform graffiti abatement around the perimeter of the lake.
S-003-RWQCB-7	**Comment 7–Construction General Permit** We acknowledge and appreciate the DEIR indicates Valley Water would seek coverage under the statewide General Permit for Discharges of Storm Water Associated with Construction Activities (Order No. DWQ-2009-0009, as amended by Order Nos. 2010-0014- DWQ and 2012-006-DWQ) (Construction General Permit). The Construction General Permit requires a stormwater pollution prevention plan (SWPPP) that specifies all BMPs that will be used to avoid impacts to State wetlands and other waters. These considerations should be incorporated into project design as early in the planning phase as possible.	The District is required to comply with applicable requirements in the Construction General Permit, including the development of a stormwater pollution prevention plan (SWPPP), and will follow the best management practices (BMPs) specified in the SWPPP during Project construction, as discussed in EIR Impact 3.K-1. The Project also incorporates measures from the District's BMP Handbook to avoid and minimize impacts on wetlands including BI-3 (Remove Temporary Fills), BI-9 (Restore Riffle/Pool Configuration of Channel Bottom), HM-7 (Restrict Vehicle and Equipment Cleaning to Appropriate Locations), HM-8 (Ensure Proper Vehicle and Equipment Fueling and Maintenance), HM-9 (Ensure Proper Hazardous Material Management), WQ-5 (Stabilize Construction Entrances and Exits), WQ-6 (Limit Impact of Concrete Near Waterways), WQ-10 (Prevent Scour Downstream of Sediment Removal), WQ-12 (Manage Well or Exploratory Boring Materials), WQ-13 (Protect Groundwater from Contaminates Via Wells or Exploratory Borings), and WQ-15 (Prevent Water Pollution).
S-003-RWQCB-8	**Comment 8– Horizontal Directional Drilling Plan** The DEIR should be revised to include a Horizontal Directional Drilling Plan. The Water Board's permit authorizing construction of the Project will require this plan, and we urge Valley Water to include the plan in the DEIR to ensure the site conditions will accommodate the plan elements. The plan must include measures to	As discussed on EIR Page 2-42, where the pipeline would cross under Guadalupe Creek, Alamitos Creek, and Almaden Expressway, the District would use horizontal directional drilling to install the pipeline beneath the creek. This is a trenchless technique with the bore pits located outside the riparian corridor. As noted in response to that comment, the impacts of directional drilling in this location are

ID	Issue Text	Response Text
	prevent impacts during horizontal directional drilling, including proposed disposal locations or methods for excess sediment, proposed sediment reuse, and related information. The plan should also include a sketch of the approximate locations of drill entry and exit points; the proposed depth of bore(s) and a description of streambed conditions that supports the proposed depth of the bore; and the approximate length of the proposed bores. In addition, the plan for a future WQC/WDRs for the Project will also require additional details such as: type and size of boring equipment to be used; the estimated time to complete the bore; a list of lubricants and muds to be used; the name of the contractor and cell phone numbers of its construction supervisor and monitor; name of the environmental and biological monitor; site-specific monitoring conditions; monitoring protocols; and a containment and cleanup plan in the event of a discharge of drilling muds or other materials to a receiving water or to a location where they could be discharged to a receiving water. During construction, the Water Board will require Valley Water to monitor drill mud pressure and volume at all times during drilling to ensure that hydrofracture or other loss of drill muds has not occurred, and precautionary measures in the event of a sudden loss in pressure or volume, and steps including immediately halting the drilling operation, to ensure that drilling muds are not discharged to waters of the State.	discussed in the EIR, including Impacts 3.K-1 and 3.E-3, which discusses use and potential discharge of lubricants and other fluids, as well as potential for erosion and release of sediments or mud, and associated effects on riparian habitat. As discussed, the Project includes control measures that would prevent slurry water from entering waterways. The control measures would include training of construction personnel, methods for preventing accidental release (including maintaining pressure in the borehole and continuous monitoring of slurry volumes at the exit and entry pits), clean-up requirements, and notification requirements. While the directional drilling plan level of details requested in this comment is not yet available, that information is not required to sufficiently identify the potential for environmental impacts under CEQA related to the proposed construction type and associated equipment needs and the resources in the affected areas. The District would provide additional details on horizontal directional drilling as part of the future RWQCB permitting process.
S-003-RWQCB-9	**Comment 9–Post-construction Stormwater Management Plan** The Project includes features that will potentially be impervious, including the levee maintenance road, boat house, and boat ramps. The Project should be designed to minimize impervious surfaces, and where impervious surfaces are unavoidable, to incorporate nature-based stormwater treatment systems such as infiltration swales, to disconnect direct discharge of stormwater runoff to storm drains and waters of the State. Such designs and treatment systems should be consistent with the Santa Clara Valley Urban Runoff Pollution Prevention Program C.3 handbook (2016 or current version). The DEIR should be revised to demonstrate the appropriate site design and stormwater treatments are incorporated in the Project before finalizing the EIR. This is necessary to ensure the appropriate amount of space to accommodate onsite stormwater treatment systems is available. In addition, the DEIR should be revised to ensure that necessary measures to control trash are included, consistent with MRP Provision C.10.	Under Impact 3.K-3, the DEIR analyzes surface runoff and drainage system capacity, and concludes that a substantial increase in impervious surfaces or volume of stormwater released from the Project site is not anticipated. The capacity of available drainage systems would not be exceeded, resulting in a less than significant impact (page 3.K-29). The proposed project design uses permeable surfaces wherever possible to promote stormwater infiltration. Stormwater running off the levee maintenance road would be directed to vegetated areas adjacent to the road to promote infiltration and remove sediment and other pollutants from the runoff before it enters the creek and lake. The post construction treatment design criteria (85th percentile 24-hour storm event) are satisfied by the proposed design so no additional measures are necessary to assure compliance with post-construction stormwater management plan requirements set forth in the MS4 Permit. EIR page 2-13, paragraph 5, has been amended to state: The levee would have an armored aggregate finish surface. ~~and~~ The top of the levee would be utilized both as a road for District and Park maintenance vehicles and as a pedestrian pathway. The new road would be surfaced with permeable aggregate base. EIR page 2-46, paragraph 5, has been amended to state: **Road and Trail Maintenance:** ~~A~~n permeable aggregate road base would be applied to the top of the new levee that would be self-maintained. Stormwater running off the levee maintenance road would be directed to vegetated areas adjacent to the road to promote infiltration and remove sediment and other pollutants from the runoff before it enters the creek and lake. The trail located within the new park area would be maintained by the City.

ID	Issue Text	Response Text
		Regarding the comment requesting measures to control trash, trash and debris removal, and graffiti abatement within the Park, including the new Park elements, would continue to be the responsibility of the City of San Jose (EIR page 2-46).
S-003-RWQCB-10	**Comment 10–Horizontal Directional Drilling Plan** The DEIR should be revised to include a Horizontal Directional Drilling Plan. The Water Board's permit authorizing construction of the Project will require this plan, and we urge Valley Water to include the plan in the DEIR to ensure the site conditions will accommodate the plan elements. The plan must include measures to prevent impacts during horizontal directional drilling, including proposed disposal locations or methods for excess sediment, proposed sediment reuse, and related information. The plan should also include a sketch of the approximate locations of drill entry and exit points; the proposed depth of bore(s) and a description of streambed conditions that supports the proposed depth of the bore; and the approximate length of the proposed bores. In addition, the plan for a future WQC/WDRs for the Project will also require additional details such as: type and size of boring equipment to be used; the estimated time to complete the bore; a list of lubricants and muds to be used; the name of the contractor and cell phone numbers of its construction supervisor and monitor; name of the environmental and biological monitor; site-specific monitoring conditions; monitoring protocols; and a containment and cleanup plan in the event of a discharge of drilling muds or other materials to a receiving water or to a location where they could be discharged to a receiving water. During construction, the Water Board will require Valley Water to monitor drill mud pressure and volume at all times during drilling to ensure that hydrofracture or other loss of drill muds has not occurred, and precautionary measures in the event of a sudden loss in pressure or volume, and steps including immediately halting the drilling operation, to ensure that drilling muds are not discharged to waters of the State.	This is the same comment as S-003-RWQCB-8, please the response to that comment.
S-003-RWQCB-11	**Comment 11–Impacts from Hazardous Materials** For impacts to Hazards and Hazardous Materials (impacts 3.J-1, 3.J-2, and 3.J-5, and 5.K, addressing release of hazardous materials, release of contaminated soil, emergency response plan or emergency evacuation plan, and cumulative exposure to or release of hazardous materials), the DEIR's findings are less than significant (LS), even when avoidance and minimization measures will be used, and are necessary, to prevent adverse impact to the environment or public health and safety. CEQA defines mitigation to include avoidance and minimization of impacts, in addition to compensation for significant adverse impacts that are unavoidable. Therefore the DEIR should be revised for these impacts with a finding of less than significant with mitigation (LSM). Regarding Hazards and Hazardous Materials impact 3.J-4, The Project is located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 or other listings, but would not create a significant hazard to the public or the environment, the DEIR found the impact to be less than significant based on sealing the Lake bed with a clay cap to prevent mercury and methylmercury from migrating to the Lake substrate and water column, and the Project will remove and dispose of contaminated sediments. The Project will result in supplying the Lake with imported water from the State Water Project as well	The first paragraph of the comment reflects a misunderstanding about the difference between BMPs and CEQA mitigation measures. BMPs ("avoidance and minimization measures") referenced in the hazards/hazardous materials impact analyses are standard, adopted District practices that are committed to by the District and included in the Project Description (see DEIR Section 2.E.1). The hazards/hazardous materials impact analyses and less-than-significant impact conclusions properly assume BMPs will be implemented. No mitigation measures are required because these impacts are less than significant. Per CEQA Guidelines Section 15126.4, EIR mitigation measures are required only to minimize significant impacts. Therefore, there is no need to revise the impact conclusions for the hazards/hazardous materials impacts to LSM. As stated under Impacts 3.J-1, 3.J-2, and 5.J (the commenter's reference to Impact 5.K (cumulative hydrology and water quality impacts) appears to be erroneous), the District would comply with hazardous materials and stormwater regulations. These regulations are designed to ensure that hazardous materials would be transported, used, stored, and disposed of in a safe manner to protect worker safety, and to reduce the potential for a release of construction-related fuels or other hazardous materials to the environment. The District would follow measures specified in the Stormwater Pollution Prevention Plan (SWPPP), National Pollutant Discharge Elimination System (NPDES) Construction General Permit requirements, relevant avoidance and

ID	Issue Text	Response Text
	as other local sources. The water supply is expected to contain trace amounts of mercury, as is typical of most central California surface waters. Therefore, the Lake will remain under the Guadalupe River TMDL, and the DEIR should be revised for impact 3.J-4 to be LSM (see also Comment 6 pertaining to the Guadalupe River Mercury TMDL).	minimization measures provided in the District's BMP Handbook, California Occupational Health and Safety Administration (Cal-OSHA) requirements, the requirements of the Resources Conservation and Recovery Act (RCRA) and Hazardous Waste Control Act (HWCA), and develop a Health and Safety Plan and a Soil Management Plan for the Project (EIR pages 3.J-14 through 3.J-17, and 5-23). As discussed in EIR Impacts 3.J-1, 3.J-2, and 5.J, compliance with applicable regulations, permitting requirements, BMPs, and safety plans would ensure the Project individually and cumulatively would not create a significant hazard to the public or the environment, and would result in a less than significant impact. Regarding EIR Impact 3.J-4, the purpose of the Project is to address the mercury contamination and reduce Almaden Lake as a source of methylmercury in the environment. With the completion of the Project, the mercury-containing sediments would be either sealed beneath a clay cap at the bottom of the lake or transported to an offsite disposal facility permitted to accept the waste. Although the new source water for the lake may still contain mercury, it is anticipated to be less than existing conditions. CEQA compares the impacts of the Project to the existing condition baseline. Section 15125(a) of the CEQA Guidelines states "This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." As compared to the existing condition baseline, the Project would reduce mercury concentrations and improve water quality in Almaden Lake. The Draft EIR's conclusion that "implementation and completion of the Project would not result in a significant hazard to the public, and the impact would be less than significant" is correct (page 3.J-19). The District recognizes that Almaden Lake would continue to be under the Guadalupe River TDML, as in the current condition. This conclusion is supported by the RWQCB's August 6, 2018 technical memorandum regarding the Project in which the RWQCB stated "The Lake Project will also significantly enhance the Lake's water quality and reduce methylmercury concentrations discharged from the Lake into the Guadalupe River system" and concluded that "We anticipate that the Lake Project will expedite delisting of the Lake as impaired for mercury under the CWA section 303(d) which would partially meet the goals of the Guadalupe River Watershed TMDL plan."
S-003-RWQCB-12	**Comment 12–Santa Clara Valley Habitat Plan** Although the Water Board is not a party to the Santa Clara Valley Habitat Plan (VHP), the VHP includes impact avoidance and minimization measures that overlap with the Water Board's regulatory requirements and with Valley Water's standard BMPs. However, the VHP has not yet developed a mitigation program that meets the requirements of the Water Board. In some cases, mitigation projects implemented by the VHP on VHP property may provide appropriate mitigation for impacts authorized by Water Board permits. But Water Board permits require that a specific mitigation project be identified to provide appropriate compensation for impacts to waters of the State authorized by a Water Board permit. At this time, payment of a fee to the VHP does not provide acceptable mitigation for Water Board permits.	This comment does not raise any issues regarding adequacy of the EIR's analysis of the Project's adverse environmental impacts. The District understands that payment of Santa Clara Valley Habitat Plan (VHP) fees are for purpose of mitigating impacts on covered species and riparian habitat. The District relies on the conclusions of the RWQCB's technical memorandum dated August 6, 2018 asserting that the Project would create a net benefit to waters (i.e., higher quality waters even though there is a net loss in terms of acreage), and thus no mitigation would be further needed for impacts to waters. As stated in the RWQCB's August 5, 2018 memorandum: "In summary, the proposed Almaden Lake Project provides a combination of water quality improvements within the Lake and restoration of riverine habitat that will provide adequate benefits to mitigate for impacts resulting from both the Lake Project, itself, and the Upper Berryessa Project."
S-003-RWQCB-13	In conclusion, we support the Project because it will improve baseline conditions. We note, however, that the preferred Project will not resolve effects of the Alamitos	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek

ID	Issue Text	Response Text
	flashboard dam downstream of the Project boundary, which results in backwater in the Project. The backwater may result in conditions that cannot support the cold freshwater habitat, fish migration, protection of rare and endangered species, and fish spawning beneficial uses in the Creek. We will continue to expect Valley Water to address those impacts in the future, and identify the opportunity to improve conditions in line with the project's stated goals. This would likely help expedite our review of a future permit application, and could minimize the need for any supplemental environmental review pursuant to CEQA.	Restoration, is not a valid CEQA alternative to the Project. Please also see the Master Response above (Section G.3.2, Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat) for a discussion of why comments related to the flashboard dam do not affect the adequacy of the EIR's analysis of the Project's adverse environmental impacts or present new adverse environmental impacts caused by the Project. Please note that the District has designed the proposed Almaden Lake Improvement Project in a way that would not preclude implementation of a future project addressing the Alamitos flashboard dam issues
S-003-RWQCB-14	Finally, thank you for convening an interagency meeting on January 22, 2020, to discuss the Project, and providing supplemental information not included in the DEIR (i.e., sediment transport technical memo, bankfull channel design memo; revised 30 percent design plan, vegetation plan, and cross sections). We were unable to timely review that information, but we urge Valley Water to incorporate it in the final EIR, with syntheses of how they inform the Project.	This comment does not pertain to the adequacy of the DREIR impact analysis or raise a significant environmental issue, but Final EIR responses to comments address some of the topics mentioned. The District will continue to coordinate with the agencies should the Project be approved and as the design progresses.

ID	Issue Text	Response Text
O-001-CalTrout.SFB-1	This Project, if implemented thoughtfully by including Alamitos Drop Structure in its design, has the potential to significantly improve water quality, native fish migration, sediment routing, riparian vegetation cover, stream temperatures, spawning gravel sorting, and benthic macroinvertebrate food production, as well as perhaps reducing the rate of methylation of mercury and its bioaccumulation in fishes and birds. To date, this represents the best opportunity for meaningful restoration of the Guadalupe River and to bolster steelhead and Chinook salmon survival and successful reproduction. One of the overarching objectives for the Guadalupe River under the FAHCE Agreement is to "restore and maintain healthy steelhead trout and salmon populations in the Guadalupe River watershed by providing… suitable spawning and rearing habitat for salmon below Calero and Almaden dams to their confluence with Lake Almaden" (Section 6.6.1). The Water District has committed to developing an Alamitos Creek Facilities Plan that includes two parts: (A) Almaden Dam. The plan will evaluate alternatives to provide unimpeded passage, both upstream and downstream, at the existing dam and reservoir; eliminate the warming of water temperature in the reservoir; and eliminate or minimize the methylation of mercury in the sediments behind the dam. (B) Almaden Lake. The plan will evaluate alternatives, including a bypass channel, to isolate Almaden Lake from Alamitos Creek and Guadalupe Creek, and to screen flow entering Almaden Lake to prevent entrainment and impingement of steelhead trout and salmon. Our hope is that the Project is intended to address the objectives outlined in the Alamitos Creek Facilities Plan for Almaden Lake as described above. We are sorely disappointed that the Water District has chosen to implement this Project unilaterally and outside of the FAHCE process. It goes against the spirit of the Settlement Agreement and the "collaborative" intent of the agreement entirely. Despite that, we encourage the Water District to fully develop, vet, and select an alternative that achieves FAHCE objectives, and to avoid selection of an alternative that potentially precludes, impedes, or delays any noted restoration needs identified in the FAHCE Settlement Agreement. This is why we stand with the Guadalupe Coyote RCD, National Marine Fisheries Service, California Department of Fish & Wildlife, South Bay Clean Creeks Coalition, and other stakeholders in supporting full development and careful re-consideration of Option 8, rather than selection of the current preferred alternative, as the environmentally superior alternative, as described below.	The Almaden Lake Project, as proposed, would meet the Project objectives as stated in the EIR. Implementation of the FAHCE Settlement Agreement is not an objective of the Almaden Lake Project, and the FAHCE Settlement Agreement is being implemented through a different process; a process the District remains committed to. However, the Project does help meet the plainly-stated objective of FAHCE Settlement Agreement section 6.6.2.1.3.3(B), which calls for completion of an "Alamitos Creek Facilities Plan" which will "evaluate alternatives, including a bypass channel, to isolate Almaden Lake from Alamitos Creek and Guadalupe Creek" and if a feasible alternative exists, "the plan will recommend action, including design and construction schedules. This Project effectively isolates Almaden Lake from Alamitos Creek and Guadalupe Creek. In addition, Section 6.6.2.1.1(A) of the Settlement Agreement calls for remediation of barriers to fish passage at the Alamitos Drop Structure, which the District believes was accomplished when it constructed a screened diversion and fish ladder. The effectiveness of the screened diversion and fish ladder has been monitored and will continue to be as part of FAHCE's adaptive management program. Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project. Further, the Project fully accomplishes the objectives established for the Project, as discussed in response to F-001-NMFS-1. As noted in the Master Response, implementation of the Project does not preclude or limit future action at the drop structure.
O-001-CalTrout.SFB-2	The Guadalupe Creek – Alamitos Creek confluence is one of the most important reaches in the entire Guadalupe River system with respect to ecological function. In addition to the poor water quality and toxicity issues associated with Almaden Lake, the Alamitos Drop Structure continues to cause other environmental impacts, including: • A backwater caused by the Alamitos Drop Structure acts as a coarse sediment routing impediment that impairs the restoration strategy of the 2013 Gravel Augmentation Plan and causes sediment to settle out, exacerbating methyl mercury loading and bioaccumulation;	This comment relates to the existing conditions baseline for the EIR, which includes the downstream Alamitos drop structure and flashboard dam. Please see the response to Comment O-001-CalTrout.SFB-1.

ID	Issue Text	Response Text
	• the drop structure can cause both upstream and downstream fish passage impediments and/or delays, which can lead to lethal or sublethal effects on fish; • The drop structure likely reduces downstream steelhead (juveniles, smolts, and kelts) and Chinook salmon (juveniles, smolts) migration survival and/or spawning effectiveness due to delays or exclusion from upstream habitat; and • The approximate 10-foot drop and concrete energy dissipation structure ("dragon's teeth") on the downstream side of the drop structure likely increases predation on juvenile and adult salmonids due to injury and/or disorientation.	
O-001-CalTrout.SFB-3	The Project under the preferred alternative may improve the site conditions at Almaden Lake for native fishes in that they no longer have to swim through the lake, but the Project as designed and described does not have sufficient detail to determine potential benefits of the newly engineered channel. Significant design details from the proposal are lacking: • What will the new stream design look like in terms of depths, velocities, and stability/grade control? Will there be adequate cover, habitat complexity, shade, and riparian vegetation to keep the stream suitable for salmonids and other native fishes? • Why is a new island being proposed in the lake, and will that only create new habitat for avian predators on fish that already frequent the site? • Finally, with the flashboard dam in place on Alamitos Drop Structure, what will the upstream effect of backwatering be into the newly-designed stream reach adjacent to Almaden Lake, and how will it affect hydraulics and suitable habitat?	The EIR included design and other information that was available at the time of its public release, and the EIR provides information sufficient for allowing meaningful analysis of the Project and evaluation of Project alternatives. As noted in EIR Chapter 2, Project Description – Summary of Fisheries Benefits, "The proposed channel restoration would facilitate natural sediment transport, allowing for movement of spawning gravel and the creation of a geomorphically stable channel. Natural sediment dynamics would facilitate the development of aquatic habitat features that are essential to suitable habitat for native fish, such as deposition of gravel for spawning, pools for rearing, and riffles for food production." The preliminary design is based on two technical memos referenced in the EIR, "Alamitos Creek Bankfull Discharge Technical Memorandum, August 2, 2016" and "Alamitos Creek Draft Sediment Transport Technical Memorandum, February 6, 2017". If the Project is approved by the District, detailed design of the Project would proceed and be used in the process to obtain permits from the applicable resource agencies. Detailed design elements would include habitat complexity features and a final landscape restoration design for Alamitos Creek. Since the release of the Draft EIR, the District had made some refinements to the Project Description and the EIR text has be revised to reflect the more current information. In addition, to the extent applicable, the environmental analysis has also been revised to incorporate the refined Project Description. While the new island would provide additional habitat area for avian species, the potential for avian use to substantially increase predation on fish over existing levels for the lake and park overall as compared to existing conditions is speculative; as the new island would have a perimeter of approximately 785 feet (or just over 1 acre) within the existing 65-acre park. In other words, it is speculative that the overall population of avian species within the existing 65-acre park would increase over existing conditions with the addition of a new island. Furthermore, goals associated with this project are restoring natural ecosystem function. Natural predator-prey relationship is part of a natural functioning ecosystem. In addition, steelhead and egrets have coevolved to inhabit the same general habitat and steelhead migration often occurs during the declining limb of storm induced flow events. During this time, water clarity is impaired which limits the feeding ability of the sight feeding egrets and herons. The reduction of non-native predatory fish associated with the Project would help to offset any loss associated with an increase in avian predator population. These fish experience a high risk of predation during migration through Almaden Lake. The reduction in predation associated with the removal of non-native fish habitat is expected to be higher than the increase in predation associated avian predators due to the installation of a new island. However, while not required to reduce a significant effect of the Project, during the Project design phase, the District will incorporate

ID	Issue Text	Response Text
		features to improve habitat for steelhead within the final landscape restoration plan. These design refinements will not alter the environmental analysis provided in the EIR.
O-001-CalTrout.SFB-4	If the Project is implemented as written under the preferred alternative, it will miss substantial opportunities to greatly improve the reach (i.e., from Mazzone Drive Bridge to Highway 85 Bridge) and the Guadalupe River from an ecological function perspective. One Water, the Gravel Augmentation Plan, and the current understanding of ecological restoration principles and geomorphological needs all mandate that we look beyond the site scale and consider the alternatives from a reach scale perspective, and to make the determination of whether the engineered creek channel would be geomorphically stable. By dealing with only a small portion of the reach (Almaden Lake) but ignoring the Alamitos Drop Structure downstream, the restoration effort is unlikely to achieve the stated goal of helping "to restore and maintain healthy fish populations by improving fish habitat" because it is unclear if "natural creek functions" would be restored, such as free flow of water, sediment, nutrients, prey resources, fish, etc. In the absence of this broader perspective, substantial cost-effective restoration opportunities will be forgone and significant time and resources will have been wasted while fish populations continue to decline in the watershed.	The Almaden Lake Project, as proposed, would meet the Project objectives as stated in the Draft EIR. As stated on page 2-7 of the Project Description, the objectives of the Almaden Lake Improvement Project (Project) with respect to fisheries include: • Reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives. • Remove potential lake entrainment of anadromous fish. • Improve temperature conditions and reduce predation for native fish. The Project would fully accomplish these objectives by separating Alamitos Creek from Almaden Lake by constructing a levee, re-contouring the remaining lake bottom and capping it with clean fill, and establishing appropriate native vegetation along the banks and floodplain of the restored Alamitos Creek channel. Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project. The Project does not preclude any future actions to address alteration of the Alamitos Drop Structure or restoration downstream of the Project.
O-001-CalTrout.SFB-5	There appears to be a critical design flaw in the design of the Project as written regarding the water surface elevation anticipated to be in the engineered stream channel during different operations at different times of the year. On the GCRCD tour of the lower portion of the Project site in January, Water District staff informed the group that the flashboard dams at the Alamitos Drop Structure are operated from mid-Spring through the winter. The DEIR confirms what we heard on page 2-4, Footnote 2: *"The flashboard dam is typically installed in April and removed in December to allow flow conveyance during winter storm events. No changes to flashboard operation would occur under the proposed Project."* By this logic, for nine months of the year, the water surface elevation of Alamitos Creek in the Project area would be 192 feet with the flashboad dam in place, according to the Site Plan and Profile on page C-02. That surface water elevation would inundate the engineered channel in the Project site with backwatering from the flashboard dam, rendering the carefully designed pool and riffle sections useless for the majority of the year and making it function like a big pond as Almaden Lake currently does now. This design flaw highlights the problem with looking at this project at the site-specific scale rather than the reach scale, where operations of the Alamitos Drop Structure and flashboard dam immediately downstream of the Project site would completely undo the proposed fish habitat, stream temperature, sediment, and other proposed benefits for nine months of the year. The Draft EIR states that with the preferred alternative, only 200 feet of the restored channel would be impacted by operation of the flashboard dam. This is a huge miscalculation based on the Site Plan and Profile 30% design drawings, which indicate the extent of	Please see the Master Response above (Section G.3.2, Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat) for a discussion of why comments related to the flashboard dam do not affect the adequacy of the EIR's analysis of the Project's adverse environmental impacts or present new adverse environmental impacts caused by the Project. The District does not believe the design has a 'critical flaw'; the design as proposed would fully accomplish the fisheries-related objectives even with the flashboard dam creating backwater effects into the restored channel and would provide better habitat than currently exists.

ID	Issue Text	Response Text
	backwatering would extend well beyond the new engineered channel. Therefore, the preferred alternative does not provide an not an acceptable solution to the problems outlined in the Project need section of the DEIR, and is not even integrated with existing water operations that have been excluded from consideration in this DEIR. Further, it provides even more evidence for quickly and sufficiently remedying Alamitos Drop Structure and its associated flashboard dam so it does not undermine this current proposed Project.	
O-001-CalTrout.SFB-6	Of the alternatives considered in the DEIR, we agree with Guadalupe Coyote Resource Conservation District and the Resource Agencies that Option 8 best addresses improvements at this reach scale, and therefore better meets the objectives of restoring ecological function desired under FAHCE and also the spirit of the District's own One Water vision for management. While the preferred alternative will improve conditions in the project area for native fishes by disconnecting Alamitos Creek from the Almaden Lake, it does little to improve conditions downstream. Dealing only with the Lake while ignoring the drop structure immediately downstream - and hydraulically-connected and influential to the Project site when the flashboard dam is in place – will on balance probably do little to meaningfully improve ecological function and create beneficial conditions for native fish. It would also be a significant missed opportunity to work with the group of FAHCE parties and other interested groups to seek a reach-wide solution in that critically important area that encompasses the confluence of Alamitos and Guadalupe Creeks, both for fish from the Guadalupe River basin and beyond.	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project. Please also the see Master Response above (Section G.3.2, Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat) for a discussion of why comments related to the flashboard dam do not affect the adequacy of the EIR's analysis or present new adverse environmental impacts caused by the Project. The District believes that the Project, as a stand-along project, provides meaningful benefits to fisheries and water quality in the Guadalupe Watershed.
O-001-CalTrout.SFB-7	The Water District mentions four primary reasons for dismissing Option 8 in the draft EIR: • Reason #1: "Does not reduce any of the significant environmental impacts of the Project." There is only one long-term impact -noise- identified in the document associated with this Option. Any of the alternatives except "no action" would fall under this exclusionary criterion because they all cause significant noise impacts. If all the project objectives described in Section 2.C.3 and the One Water objectives are considered as selection criteria, Option 8 would likely be ranked the highest for meeting those objectives (inclusive of sediment routing, fish passage/linkages, and habitat restoration). Furthermore, if these objectives were considered for the reach instead of the limited site (including downstream of the Alamitos Drop Structure), Option 8 would further stand out as the environmentally preferable option. • Reason #2: "Beyond the scope and budget provided by the Valley Water's Board." The DEIR does not present the benefits of the project at the reach scale, and with respect to project and One Water objectives. Accordingly, we are concerned that this exclusionary criterion is being used to eliminate the environmentally preferable alternative without the Board having the opportunity to fully understand its benefits, weigh the full costs of it versus other options and formally consider it. In addition, the cost of an alternative can't be used as a criterion to eliminate a potential option without fully developing that alternative to be considered on its merits under CEQA. When taking into account the long-term potential liability and real costs associated with long-term maintenance of the Alamitos Drop Structure, sediment removal near the Guadalupe Creek/Alamitos Creek confluence to ameliorate flood risk, and the potential mitigation credits gained by restoring ecological function under Option 8, it	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA Alternative to the Project. Regarding construction and operational significant impacts of the Project (pre-mitigation), there are many more than just noise. See Table S-2 for a complete listing. The ability of the alternatives evaluated in detail to reduce these impacts is summarized in DEIR Section 4.C. The commenter's discussion of "selection criteria" based on ability to meet project objectives is not consistent with CEQA's framework, which is to identify an environmentally superior alternative that has on balance the least environmental impacts. In addition, the general list of One Water objectives was developed for a different purpose, and is independent from the Project-specific objectives that were properly used to help develop the range of DEIR alternatives. Based on the above considerations, and statutory requirements of CEQA, Alternative 2 is the environmentally preferred alternative. The commenter's statement that "the cost of an alternative can't be used as a criterion to eliminate a potential option without fully developing that alternative to be considered on its merits under CEQA." is incorrect. An EIR is not required to analyze alternatives that are infeasible. CEQA Guidelines Section 15126.6(a). Alternatives that are not potentially feasible can be excluded from An EIR's range of alternatives that are evaluated in detail. ""Feasible" means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account *economic*, environmental, legal, social, and technological factors." CEQA Guidelines Section 15364, emphasis added.

ID	Issue Text	Response Text
	is worth fully developing that alternative for consideration. Further, full examination of a reach-scale solution such as Option 8 likely would open up cost-sharing opportunities through federal and/or state grant programs specifically developed to aid in the recovery of Chinook salmon and steelhead through fish passage improvement projects, of which we have a strong track record in securing, managing, and putting on the landscape across California. • Reason #3: "Downstream loss of potentially jurisdictional Waters of the US." This loss of jurisdictional water, if any, would be very small. More importantly, the ecological value of the post-project jurisdictional waters would be greatly enhanced (a functioning river corridor rather than a wide, flat water heater), and would almost certainly provide greater habitat benefits at the site and in downstream reaches than the Preferred Alternative. Such benefits are deemed sufficient to offset the loss of jurisdictional waters under the United States Army Corps of Engineers Nationwide Permit Number 53 for removal of low-head dams: "Because the removal of the low-head dam will result in a net increase in ecological functions and services provided by the stream, as a general rule compensatory mitigation is not required for activities authorized by this NWP." • Reason #4 "Uncertainty about feasibility of alternative water diversion system." There are numerous solutions to alternative water diversion systems, including an engineered infiltration gallery, which could be installed under the stream channel at the upstream end of Almaden Lake site, and a gravity fed pipe could deliver needed water to the downstream percolation ponds. This would preclude the need for any fish screening, would eliminate adult fish migration delays or impediments, eliminate elevated downstream migration mortality and predation, allow coarse sediment to naturally route downstream and replenish gravel storage in downstream reaches, restore a riparian corridor through the reach, and reduce thermal exposure and heating in the reach. These alternative water diversion systems have been designed and implemented in many places (e.g., lower Tuolumne River infiltration gallery). Another important consideration is the remaining environmental impacts of not remediating the impacts of the Alamitos Drop Structure, such as the continued need for expensive and ineffective gravel augmentation downstream, downcutting and instability of the channel, and a significant lack of sediment in the southern portion of San Francisco Bay that is necessary to stem the advance of saltwater intrusion due to sea level rise from climate change. If the remedy of such costly ongoing environmental impacts of the Alamitos Drop Structure were adequately enumerated and considered in the evaluation of alternatives, then Option 8 would again be a superior alternative because it is the only alternative that remedies these ecological impacts.	Regarding "the remaining environmental impacts of not remediating the impacts of the Alamitos Drop Structure," please note that any such impacts are part of the DEIR baseline. An EIR need not consider an alternative that addresses preexisting problems that are part of baseline, but do not address the proposed project's significant environmental impacts. *In re Bay-Delta*, 43 Cal.4th (2008) 43 Cal.4th 1143 1167–1168. The selection of CEQA alternatives is not focused on maximizing ecological benefits, rather it is focused on minimizing adverse environmental effects. The downstream loss of jurisdictional waters is another example of how project impacts would increase with an expanded project. An expanded restoration project would likely provide better ecological benefits, but would also have more direct impacts to jurisdictional waters. The uncertainty of an alternative water diversion system to maintain groundwater recharge in the Alamitos and Guadalupe Ponds was provided as an example of the additional time, money, and effort that would be necessary to remove the drop structure. Any alteration of the existing diversion structure would require alteration of the related water right with the State Water Resources Board, a multi-year process that would add uncertainly to the District's water rights. The construction, operation, and maintenance of a new diversion structure would include its own adverse impacts to Alamitos Creek; any type of in-stream diversion structure that ponds water would result in similar impacts than those trying to be avoided. An infiltration gallery as suggested would likely result in the net loss of in-stream groundwater recharge and require regular in-stream maintenance. The District must decide on the scope of its projects given competing priorities for available resources, and has considerable discretion to identify and pursue a particular project designed to meet a particular set of objectives. The District has the funding to pursue the project at Almaden Lake, which would provide benefits to water quality and fish habitat. Unfortunately, it does not have unlimited resources to pursue all potential restoration projects.
O-001-CalTrout.SFB-8	California Trout and San Francisco Baykeeper encourage the Water District as strongly as possible to reconsider Option 8 as the Preferred Alternative for the reasons discussed above. Given the importance of this reach to the ecological function of the Guadalupe River, it is important to take advantage of the opportunity provided by the project to expand its spatial scope to consider the reach scale benefits and remedy the ecological impacts of the Alamitos Drop Structure. We realize that reconsidering the preferred Alternative could broaden the overall scope of the Project and thus delay implementation. However, given the expense of the current proposed Project and the risk of not getting it right (continued declines in population that may render them	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA Alternative to the Project. The commenter is essentially requesting that the District implement a different, more expanded project, with different objectives. However, under CEQA, the District has considerable discretion to identify and pursue a particular project designed to meet a particular set of objectives. *California Oak Foundation v. Regents of University of California* (2010) 188 Cal.App. 4th 227,276.

ID	Issue Text	Response Text
	difficult to recover at all), it would be cost-effective and environmentally prudent as watershed stewards to also remedy the Alamitos Drop Structure as part of the same project. From both fiscally responsible and environmental stewardship perspectives, it is better to do one larger project correctly that looks at the function of the entire reach, than piecemeal two projects and risk not restoring ecological function quickly enough to benefit the already dwindling fish populations. California Trout is ready to mobilize to assist the District in pursuing additional design, engineering, and funding assistance as needed to facilitate Project implementation in a way that restores ecological function and serves FAHCE goals.	There is no "piecemealing" of one larger project because the Almaden Lake Improvement Project has independent utility and does not depend upon whether a different project is implemented at the Alamitos drop structure, nor would implementation of the Project preclude future opportunities for restoration downstream or define a set path downstream would need to follow.
O-001-CalTrout.SFB-9	If the Water District chooses not to revisit Option 8 as the Preferred Alternative, then we urge you to modify the Project to divide the reach into two phases: Almaden Lake Isolation and channel restoration (Phase 1), and Alamitos Drop Structure remediation and eventual removal (Phase 2). Such a plan, as described in the GCRCD comment letter, would include: • Installing an alternative diversion structure (e.g., infiltration gallery – Tuolumne River, rubber bladder dam – Alameda Creek) as part of the Almaden Lake site design and mothball the new diversion structure for future use once Phase 2 is implemented (as was done on the lower Tuolumne River infiltration gallery). • Designing Phase 1 with respect to a natural grade based on extending the project longitudinal profile to upstream of Mazzone Road and downstream to Blossom Hill Road (or Hwy 85). This doesn't imply that there will be Phase 2 construction over this reach, just that the design incorporates this slope (i.e., a reach-scale design perspective). Functionally, this would result in stream channel design in the Almaden Lake footprint that has a steeper slope (some of which would be in the Alamitos Drop Structure backwater until Phase 2 is implemented). • Work with the FAHCE stakeholders and other NGO's to develop an ecologically friendly design for both Phases, and potentially collaborate on funding and/or design assistance for Phase 2. We request that you either revisit Option 8 as the Preferred Alternative, or revise the current Almaden Lake site design to accommodate a Phase 2 remediation and restoration of the Alamitos Drop Structure.	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project. The Project does not preclude future actions to restore the Alamitos drop structure as a separate project. However, to make it a formal two-phase project would require the District to complete CEQA review of a second phase now. This would delay restoration at Almaden Lake for an extended period. Installing a bladder dam in the Almaden Lake footprint would create impacts that the Project is trying to eliminate. An infiltration gallery in the footprint would eliminate the riffles and runs that are proposed by the Project to improve fish habitat. As noted in the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative), the elevation of the channel is set at the Coleman Road bridge, therefore the slope of the channel can only be considered between Mazzone Road and Coleman Road and the slope between Coleman Road and Blossom Hill Drive would need to be considered separately.

ID	Issue Text	Response Text
O-002-CCCR-1	From an overall perspective, we are pleased that the District is proposing implementation of the Project. Its improvements appear likely to reduce the hazards of existing water quality conditions, to upgrade conditions for fish passage and to provide improved habitat conditions both in its footprint, in upstream and downstream channels and in the Bay.	This comment does not raise a concern that relates to physical impacts of the Project or to any significant environmental issue related to the Project. The District appreciates the positive response to the proposed improvements.
O-002-CCCR-2	Overall, this Project is appropriate in environmental improvement intent and will pursue complex implementation that we hope to see succeed. An outstanding concern is the downstream Alamitos Creek flash dam. It is not part of the Project footprint but in continued periodic redirection of water flow to percolation ponds, it will limit the success of the Alamitos Creek fish passage improvements. It will continue to disrupt fish migration and appears likely to limit reduction in water temperature. We urge Valley Water to consider improvements that can replace this creek obstruction.	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project.
O-002-CCCR-3	A unique function of the Project (DEIR p. I-2) is to fulfill off-site mitigation requirements of the District's Upper Berryessa Creek Flood Risk Management Project (Upper Berryessa Project), per an order of the Regional Water Quality Control Board (Water Board). As any mitigation action can apply only once, it is relevant that this DEIR identify which mitigation actions, or portions of actions, that apply to this Project or to the Upper Berryessa Project. Unfortunately the DEIR does not do so. Through our prior reviews of the Upper Berryessa Project, we are familiar with that project's Water Board Order R2-2017-0014 of August 28, 2017, requiring mitigation not considered previously by that project and determined to not be feasible in that project's footprint. Similarly we reviewed and responded in comments to the Water Board's August 27, 2018 Rationale for Acceptance that would approve offsite fulfillment of Upper Berryessa mitigation as part of the Alamaden Lake Project. While the DEIR acknowledges the Upper Berryessa mitigation requirements and references the same documents in introductory comments, it makes no further reference to it nor as to how the Almaden Lake Project satisfies mitigation for both projects. By that significant omission, the DEIR inadequately informs the reader. For instance, regarding discussion of impacts: • Which mitigation requirements apply to only one of the projects or to both? • For any mitigation that applies to both projects, by what measure(s) can a mitigation assign appropriate mitigation compensation to each project, such that the obligation of each project is met? The omission of this information from both mitigation discussion and mitigation statements must be corrected. In the Water Board's Rationale there is relavant discussion (Section E, page 9): "Mitigation Analysis to Compensate for Impacts of Both Almaden Lake and Upper Berryessa Creek Projects." Although written sometime before issuance of this DEIR and thereby tentative, the Water Board Rationale provides examples in Section E and elsewhere that may serve as guidance in assigning mitigation credits that demonstrate how the dual-project obligation is met.	As discussed on EIR page 2-7, The Project purpose is to restore Alamitos Creek's function within the footprint of Almaden Lake Park in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint, and minimizing impacts to existing recreational features within the Park. Thus, the intent of the Project is to increase habitat, and improve existing habitat, functions and values. This comment does not raise a significant issue related to EIR adequacy. As the comment notes, in 2018, the RWQCB memo indicated that the Project provides "a combination of water quality improvements within the Lake and restoration of riverine habitat that will provide adequate benefits to mitigate for impacts resulting from both the Lake Project, itself, and the Upper Berryessa Project.' See response to Comment S-003-RWQCB-1." Specifically, the RWQCB determined that the Project would restore 11 acres and 1,800-linear feet of Alamitos Creek, and such habitat improvements will improve several beneficial uses (COLD, RARE, MIGR, SPWN, and WILD), which translates to significant lifts in function and value of Alamitos Creek. The RWQCB also determined that the habitat improvements would extend far beyond the lake by restoring connectivity for salmonids for approximately 28 miles. In addition, the RWQCB found that the Project would enhance 16 acres of the Almaden Lake. Consistent with the RWQCB's analysis and findings in its 2018 memo, the Draft EIR also concludes that the Project's impacts on jurisdictional waters, wetlands, and habitat would be less than significant and no further mitigation would be required as the Project's benefits would offset the temporary and permanent impacts resulting from the Project. Notwithstanding the above response, please note that the issue of how mitigation credit may be assigned to a different project does not affect the adequacy of the Almaden Lake Improvement Project EIR's impact analysis. As the District proceeds with design and permitting of the Project, it will engage with the RWQCB to address permitting related issues.

ID	Issue Text	Response Text
	As mentioned in the Rationale (p. 13), the final Almaden Lake Project "designs, monitoring of wetlands and performance criteria" will need to be acceptable to the Water Board. Perhaps DEIR solutions regarding assignment of mitigation, a unique and unusual requirement, might be best determined in consultation with the Water Board? As the preferred alternative and discussions of this DEIR are now available, guidance of the Rationale may also need adjustment. Consultation and resulting documents could be included in this DEIR, providing the needed explanations and assignment of compensatory mitigation.	

ID	Issue Text	Response Text
O-003-SSRG-1	We are deeply concerned with the failure of the draft EIR to address offsite sanction relocation areas while the entire project is being completed or as project matures to a functional biological region. (In table Fisheries Resources Impact 3.E-1)	This comment summarizes more detailed comments included within Comment Letter S-001-CDFW. Please see responses below.
O-003-SSRG-2	It does not address the new threatened or endangered species -the Green Sturgeon and White Sturgeon - now entering the watershed using the Almaden lake region; there is no mention of how SCVWD intends to accommodate these species during or after implementation. These species are highly affected from dredging operations because juveniles feed on zooplankton before shifting mostly to benthic macroinvertebrates. The draft EIR does not specify or mention a plan of protection in case they are encountered during netting activity. Relocation within upper streams is inadequate for these large species Sturgeon. Other filter feeders that live in deep water mussels. Regarding the two large tributaries that come together (Los Alamitos Creek and Guadalupe Creek), the flow regime clearly shows that large species are able enter this region of the project. Both Sturgeon and steelhead entered during extreme drought years 2014 through 2015. Depth to pool ratios need to be stated in order to protect these species safely as flows come. The document does not mention using an off-site sanctioned and patrolled location for holding these species, and which others can hold during summering seasons. Confining fish species without proving that these upper lower areas can accommodate them has not demonstrated or studied as the areas may already be in use by existing species. Relocation to upper or lower areas is not an option; both overcrowding and relocation to lower and upper reaches of the project may stress out these species due to the lack of food source that can only be found in the lake. Native species with enormous schools threaten fin shad, Roach minnow, other minnows species and California Sucker and many other will be in the millions. Other variables species will be found when netting activity takes place within the lake. SSRG believes there's a 75 % to 90% chance these species of Sturgeon will be found within netting activity; there's even a greatr possibility in trapping them indefinitely in other two ponds. Netting activity must be done within two other ponds; EIR does not address these factors in stranding native and threatened species of fish in these other ponds.	Green sturgeon is federally threatened and a state species of special concern. White sturgeon is a state species of special concern. The District has collected approximately 16 years of fish sampling data using electrofishing in the Guadalupe River and approximately 5 years of data using an unattended camera monitoring system at the Alamitos Drop structure and has never detected either species of sturgeon. Sturgeon is not recorded in the Project area in the California Department of Fish and Wildlife Natural Diversity Database, and the National Marine Fisheries Service has not raised concern about sturgeon in the Project area. The District has observed a white sturgeon in the tidal portions of the Guadalupe River, which is expected; however, this species is not expected as far upstream as Lake Almaden. Green sturgeon have not been observed south of the Dumbarton Bridge. Spawning for this species occurs in the Sacramento River. Based on past surveys of the lake and Guadalupe River, these is not evidence to support the number of fish suggested in this Comment. Further, threadfin shad is a non-native species. It is not clear what other two ponds are referenced in this Comment. However, project construction is limited to Almaden Lake and the associated Project pipeline alignments. Thus, would no impact to fish in other ponds.
O-003-SSRG-3	It well known that Almaden Lake is fairly deep, and during the drought feeding flows from the Arroyo Calero Creek went subsurface before reaching Almaden Lake then resurfacing from the bottom of Almaden Lake. It is also well known Steelhead Rainbow Trout summer in the lake as temps are cooler from upwell water from the bottom the lake. People report angling from under Coleman Road Bridge and catching Steelhead rainbow Trout through the summer season. (This was reported by Educator Richard Tejeda). There is no mention on how to migrate these factors. The proposed design is a poor design; excavation or refilling of new materials should be at least 85 to 90 ratio to cobble rock to allow the new channel to filter water up or down and laterally move water to other two ponds. Using compacted dirt soils will degrade functionality of natural streams that can moves flows up or down.	As described in EIR Section 3.E – Fisheries Resources - it is recognized that native fish may be in the Project area during dewatering and impacts to those species may occur during project dewatering. Mitigation Measure 3.E-1 requires the preparation and implementation of a native fish capture and relocation plan to ensure this impact is reduced to a less than significant level. As described in EIR Impact 3.K-1, the restored creek channel would be designed to have a stable geomorphic channel with a riffle-pool-run pattern, designed to neither aggrade nor degrade for the entire length of the restored creek section. Channel design would be informed by two technical analyses developed by the District: Alamitos Creek Draft Sediment Transport Technical Memorandum (2017) and Alamitos Creek Bankfull Discharge Technical Memorandum (2016) (page 3.K-24). The design is also meant to mimic the reach upstream of the Project area. Alamitos Creek upstream of the Project has a similar width and low flow channel as the

ID	Issue Text	Response Text
	Lower project needed remedy from catastrophic failures in Reach 10 of Army Corp project from improper design width ratios and not enough beneficial material to keep a channel stable. Area was reconfigured with right width ration and gravel cobble fundamental to keep the entire river channel functional. Above: Recent photo Jan 23, 2020 looking from and south from (SCVWD) projects below the Alamitos Drop structure that were implemented in 2018; areas are starving from the most fundamental material as the photo shows. No gravel and/or the lack of gravel cobble is causing same failures because using compacted soil or insufficient or missing materials is failing to keep the hold channel stable. Using soil and plants are insufficient as water erosion carries these soils to other successful projects downstream of Blossom Hill Road. Above: Recent photo Jan 23, 2020; looking from and south from (SCVWD) projects below the Alamitos Drop structure that were implemented in 2018; areas are starving from the most fundamental material as the photo shows a dusting of cobble rock is mostly all gone down stream; while the main channel still has gravel, the banks are not stable.	Project design. The Project design is not based on element of the Guadalupe River project.
O-003-SSRG-4	Upper tributaries from the Almaden Lake project are very flashy; these other gages illustrate what happen between small rain storms. What will be down to alleviate possible other species strandings in the future?	The Project is limited to the Almaden Lake area and would not alter flows in Alamitos Creek or upstream tributaries. The analysis in the EIR is limited to direct and indirect effects caused by implementation of the Project.
O-003-SSRG-5	Data that (SCVWD) should have collect during drought was not collected, so that is why I'm adding the data to this document.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. It is not clear what data is being referenced in this Comment.
O-003-SSRG-6	The draft EIR fails to specify what new endangered or threatened new species can be found in Almaden Lake or to upper tributaries in same regions (Guadalupe Creek within the vicinity of Masson diversion and ladder in Santa Clara Valley Water District operations.)	Appendix C of the EIR contains four lists of special-status species that may be found in the Project area: C.1) Special-Status Plants and Animals Documented in the Project Region; C.2) California Department of Fish and Wildlife: California Natural Diversity Database; C.3) California Native Plant Society: Rare Plant Program Inventory of Rare and Endangered Plants; and C.4) United States Fish and Wildlife: List of Threatened and Endangered Species that May Occur in the Proposed Project Location. EIR Sections 3.D and 3.E summarize those species and consider the effects of the Project on those species, and as needed, includes Mitigation Measures that would reduce the effect of the Project to less than significant levels.
O-003-SSRG-7	SCVWD contracted services of a second party consultant Tucker Construction Inc. without having a certified Biologist to conducting netting/sagging operations within (SCVWD) operations at Almaden Lake. Calling in (CDFW) special agents without calling or advising (SCVWD) scientific teams being present to record or report the take or relocation during June to July of year of 2015 of any new endangered or threatened species within Santa Clara Valley Water District managed operated regions.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. This comment may relate to work performed by District staff near the drop structure while the creek was dried during the drought. There was regrading of the channel to create a pool in the area adjacent to the ladder that was performed without a biological monitor present as required by the Stream Maintenance Program and District policies. The incident was reported to the regulatory agencies. The District also investigated the incident and altered its monitoring obligations based on a Root-Cause-Analysis and Corrective Action Plan.
	Call to California Department Fish and Wildlife CALTIP log during June of 2015 to rescue one Green Sturgeon in drying pool above the Alamitos Fish Ladder where hundreds large carp are seen in photos. Thousands of smaller fish were netted and destroyed.	The California Natural Diversity Database maintained by the California Department of Fish and Wildlife does not include any sightings of surgeon species in the Project area.

ID	Issue Text	Response Text
	The County of Santa Clara Division of Vector Control's survey crews while controlling mosquitoes with mosquitoes fish found a large White Surgeon within this other location, Guadalupe Creek within 1 and 1/2 mile from Almaden Expressway Bridge (where it goes over Guadalupe Creek near down stream of Masson dam and fish ladder diversion from regions down where lateral up-welling flows come on incisions of deep pools on Guadalupe Creek from adjacent offsite recharge of several ponds.	
O-003-SSRG-8	Also, the EIR document has no mention what protocol will be used in the event these other animals are found within netting activity. Some have been found in other regions of operations on Coyote Creek; two types of Crustacean where identified native Floater Mussel and Delta Version which are not native but provide valuable food source for Sturgeon. Both mussel are filter feeders and like muddy to sandy bottoms in deep water, and can be a primary source of food for sturgeon. Native Freshwater mussel were identified within the ponds of operation during the drought as the pond dried in year of 2015 in SCVWD. As SCVWD ponds went dry, no staff was sent to document or rescue organism from drying creek or drying SCVWD ponds. Those mussel species that sturgeon can eat whether invasive of not . will they be save or rescued too? The EIR has no mention of this factors. SSRG has recorded that many animals depend on these organisms, including Sturgeon, Water fowl, Raccoons, otters.	No efforts to salvage these species would occur. Invertebrates can rapidly recolonize after restoration. It is expected that invertebrate species would reestablish to a level that is consistent with upstream reaches.
O-003-SSRG-9	In conjunction with Almaden Lake Improvement Project, no information can be found on how the Alamitos Drop Structure and ladder will be used to control the influx on invasive species returning to these reach up stream of the Drop structure and the fish adder within the new proposed pools or new enhanced new channel. Clearly SCVWD knows that Almaden Lake to Alamitos Fish Ladder is overwhelmed with invasive species, especially below entrances and exit of the ladder. There also is a failure to open the education-viewing window so the public can observe from the view chamber within ladder what can be observed.	The Alamitos drop structure and fish ladder are not designed to control the influx of invasive species. The Project reduces the existing risk of predation by removing native fish from the large lacustrine habitat (i.e., Almaden Lake) preferred by nonnative predatory fish and replacing it with riverine habitat that is not as conducive to the life history requirements of nonnative predatory species. Though a small impoundment will remain when the flashboard dam is in place, it will be aligned with the channel, and the overall linear footage of lacustrine habitat will be reduced. The area of impounded water would also only occur seasonally (April-December), and not during the peak of steelhead migration, when this species would be most vulnerable to predation.
O-003-SSRG-10	That why our Salmon and Steelhead Restoration Group will be petitioning Santa Clara Valley Water District to have their consultants work directly with Salmon and Steelhead Restoration Group to bring in their expert consultant. SSRG collected data on fish killing areas that occurred during the drought 2014 through 2016 in this proposed area and lower river regions of Guadalupe River, and hopes to help alleviate some of the causes for illegal take of species, and to help SCVWD develop an appropriate strategic plan or approach to oversee Santa Clara Valley Water District operation as third party consultant while operation take place. Removal of sediment and gravels by heavy machinery significantly impacts to a watershed. There is a track record for SCVWD for conducting these most serious operational tactics in 10 to 13 locations that can impair river system while endangered Steelhead and Chinook salmon are attempting to repopulate a watershed, and when knowing endangered and threatened fish are using rearing area within lower River system. SCVWD continues removing the most important fundamentals that can keep water cleaner and reduce invasive species from flourishing. To propose such operations in	Stream maintenance is conducted consistent with the District's Stream Maintenance Program which requires the approval of an annual work plan from state and federal regulatory agencies. The restored creek channel would be designed to have a stable geomorphic channel with a riffle-pool-run pattern, designed to neither aggrade nor degrade for the entire length of the restored creek section. Any maintenance needed in the channel would be conducted consistent with the requirements of the Stream Maintenance Program. Sediment is reused when possible, although this opportunity is more limited in the Guadalupe Watershed based on legacy mercury from upstream sources.

ID	Issue Text	Response Text
	this immediate area where deep filter feeder and new species are found is not sane practice. No method or process outlined to help the separation gravel and sediment as it's in transit, or as flow pushes them down to lower area to designated capture zone for targeted dredge. SCVWD constantly doing this type of operation is disturbing and altering a natural watershed. We stress that it's important to find other method, and to find other more appropriate techniques used by other experts from Wildland hydrology to separate gravel rock from sediments while in transport so they can be readily captured and available to be used again instead of starving depleted entire watershed from the most important fundamental gravel rock.	
O-003-SSRG-11	Salmon and Steelhead Restoration Group would like to ask for additional time so we add very important comments. These other comment and data will be provided as they become readily available.	It is noted that the Draft EIR comment period was extended by one week to accommodate agencies and organizations wishing to submit comments; and the Salmon and Steelhead Restoration Group was able to submit a comment letter.

ID	Issue Text	Response Text
O-004-SCCCC-1	First I would like to commend the technical staff for the innovative and creative approach to reducing the percentage of the project footprint subject to the backwater from the flashboard dam at the Alamitos Drop Structure. This significantly enhances the potential for this project to realize the temperature reduction and habitat enhancement benefits of the project.	This comment does not raise a concern that relates to physical impacts of the Project or to any significant environmental issue related to the Project.
O-004-SCCCC-2	1. It does not provide "sufficient information" to enable "meaningful evaluation" of the most important alternative to the proposed project, namely, the set of alternatives described in the letters to the District from NOAA Fisheries in 2014 and several environmental groups in January 2017. In fact, it dismisses this set of alternatives with euphemisms and "circular straw man arguments" rather than meaningful technical analysis.	Please see Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project.
O-004-SCCCC-3	2. It does not provide a discussion of the regulatory framework for temperature in streams, principally requirements of the Regional Water Board. Since temperature conditions are one of the most significant environmental stressors in the study area, and a source of significant controversy, the impact of the project on this parameter in terms of the regulatory framework needs a substantive analysis.	The San Francisco Bay Basin Water Quality Control Plan (Basin Plan) contains the following temperature objectives for surface waters: • The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses. • The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature. As demonstrated by the EIR, the Project would not violate applicable temperature water quality objectives. The Project would eliminate Almaden Lake as a source of warming for downstream Alamitos Creek and Guadalupe River flows and allow Alamitos Creek water to flow through the restoration Project site unimpeded. As discussed on EIR page 3.E-22, completion of the Project would facilitate increased movement of native fish species within the Project site and throughout the watershed. The restored Alamitos Creek channel would allow migratory fish species easier access to spawning grounds within the headwaters of the Alamitos Creek watershed and reduce in-stream temperatures as compared to existing temperature condition in, and downstream of the lake. The reduction in temperatures would be a beneficial impact to steelhead and other species that may be within Alamitos Creek within the Project area.
O-004-SCCCC-4	3. The EIR asserts that the project will reduce temperature without any quantitative analysis of how the project will impact thermal input nor impact resulting temperatures in the study area. Nor does it include a summary of the readily available temperature data relevant to decision making for the project. Nor does it provide any estimate of the temperatures resulting from the project in the study area. So its claim of temperature reduction is unsupported by the EIR and contradicted by available temperature data not included in the EIR, especially the Jones and Stokes Temperature model of 2004 that made estimates of the impacts of temperature on the study area if the equivalent of Alternative 8 was not constructed.	CEQA Guidelines Section 15126.2(a) indicates that "an EIR shall identify and focus on the significant environmental effects of the proposed project on the environment. In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the existing physical conditions in the affected area as they exist at the time the notice of preparation is published, or where no notice of preparation is published, at the time environmental analysis is commenced." Thus, impacts associated with the Project's creek fisheries and associated creek temperature effects are determined by comparing existing conditions (Almaden Lake) to the Project's proposed restored and free flowing creek channel condition. As discussed on EIR page 3.E-11, due to the unnaturally varied depths within the lake, and the lake's large surface area to volume ratio, surface temperatures of the lake are elevated compared to the upstream Alamitos Creek source water. These elevated seasonal water temperatures present a potential thermal impediment to steelhead and other anadromous fish (SCBWMI, 2003) and a

ID	Issue Text	Response Text
		source of warming for flows released to downstream areas of Alamitos Creek and the Guadalupe River. During summer months, seasonal warm temperatures extend downstream of the lake into the Guadalupe River, as warm water released from the lake travels downstream. The elevated temperatures and lacustrine habitat in the lake also supports nonnative fish species that potentially prey on steelhead and other native species. Entrainment of anadromous fish in the lake is also possible, making it difficult for steelhead and other anadromous fish to find the source stream at the upstream end of the lake (SCVWD, 2013). The Project would restore and separate Alamitos Creek from the existing lake; thus, temperatures within the Project reach of the creek would be consistent with reaches of the creek upstream of the lake. A qualitative analysis of temperature beneficial impacts is sufficient to meet CEQA requirements. The comment provides no evidence that the Project would have any adverse effects on temperature, compared to baseline conditions. The Jones and Stokes study does not contradict the finding of the Draft EIR. In 2004, Jones and Stokes modeled temperature under multiple scenarios of creek/lake separation. The modeled scenario that most closely relates to the current plan was defined as a "shaded short bypass," that uses a 0.4-mile-long bypass channel through the lake bed. This scenario takes into consideration the operation of the flashboard dam. This study modeled an average monthly reduction, after vegetation is established, of up to -8.3°F within the lake footprint and -0.6°F three miles downstream (Jones and Stokes 2004). This modeling effort did not take into consideration many of the current Project attributes, such as length of bypass, establishing natural riffle/run/pool complexes mimicking upstream conditions, and establishing riparian shading along the stream margins, which would further aid in establishing natural hydraulic and hydrological function. Since the model does not take into consideration Project specific attributes and the bypass channel in the study is longer and without riffle/run/pool complexes or the degree of riparian shading proposed as a part of the Project, the model results at best predict a conservative estimate of the temperature benefits associated with the proposed creek/lake separation and restoration Project.
O-004-SCCCC-5	4. It asserts that the operation of the project will cause less than significant impacts, but contains no description of the flow regime, including the requirements of FAHCE and the requirements of the Streambed Alteration Agreement, nor the resulting temperatures in the study area. So the assertion is unsupported by the EIR. Since the channel is a new channel, the EIR needs to describe the flow and temperature conditions that will result from project operation.	It is unclear which "less than significant impacts" conclusions are referenced in this comment, but all significance conclusions in EIR are supported by substantial evidence. The Project would not alter the current flow regime of Alamitos Creek, and once the creek is separated from the lake, Alamitos Creek flows would be allowed to flow through the Project footprint with no warming or fish movement impediments related to the current impoundment of creek flows within the lake, resulting in unimpeded and unaltered creek flows through, and downstream of the current lake, which approximate current instream flow temperatures upstream of the lake. As noted in the response to Comment F-001-NMFS-8, FAHCE measures, including FAHCE flow measures, are being implemented through a separate process; however, if flows in the Project vicinity are altered through the implementation of FAHCE in the future, the Project would still allow Alamitos Creek flows to run unaltered and unimpeded through the Project footprint, providing continuing future benefits for the ecology of the watershed. The Project would not change Lake and

ID	Issue Text	Response Text
		Streambed Alteration Agreement (LSAA) requirements at the flashboard dam, and there is no LSAA currently applicable to Almaden Lake.
O-004-SCCCC-6	5. It does not provide sufficient information to evaluate the methodology used to determine the width of the so-called low flow channel nor why the low flow channel wasn't sized to allow complete canopy cover to reduce temperatures in the stream.	As described in Impact 3.K-1, the restored creek channel would be designed to have a stable geomorphic channel with a riffle-pool-run pattern, designed to neither aggrade nor degrade for the entire length of the restored creek section. This channel design is informed by two technical analyses developed by the District: Alamitos Creek Draft Sediment Transport Technical Memorandum (2017) and Alamitos Creek Bankfull Discharge Technical Memorandum (2016) (page 3.K-24). The design is also meant to mimic the creek reach upstream of the Project area. Alamitos Creek upstream of the Project has a similar width and low flow channel as the Project design, and it is noted that vegetation in this reach provides substantial cover of Alamitos Creek. Although riparian shading can reduce temperature over long distances, it can also reduce primary production which fuels the food chain. Even in a full open channel with no shading there would likely be little or no temperature increase over the 1,800 lineal feet of restored channel, and instream flow temperature and fish migration conditions would still improve as compared to existing conditions. A detailed landscape restoration plan would be prepared should the Project be approved and design progress.
O-004-SCCCC-7	6. The EIR has mischaracterized the findings of the Regional Board with respect to unaddressed impacts of the proposed project. Specifically, the Regional Board memo referred to in the EIR states that "Thus, although the Lake Project provides incremental benefits on a larger scale, it will not resolve all the constraints on beneficial uses in this reach due to the flashboard dam." And "Temperature monitoring in Alamitos Creek, within, upstream and downstream of the Lake Project's reach will be necessary to track whether the Lake Project improves temperature in that reach and to calibrate the temperature model.": and "The Alamitos Flashboard Dam will continue to be a passage barrier in the Guadalupe River because the impoundment results in water warmer than without the flashboard dam. Therefore, the flashboard dam limits the benefits of the Alamitos Creek Restoration Project… Therefore, the MMP (Mitigation and Monitoring Plan) should include details for how flow is managed,,,"	The Draft EIR did not "mischaracterize" RWQCB findings; rather; it included only the portion of the RWQCB memo most relevant to contextual discussions of the project serving as mitigation for the Upper Berryessa Flood Risk Management Project. As stated in the Master Response (Section G.3.1. Consideration of Additional CEQA Alternative), the Project as proposed would fully accomplish the identified fisheries-related Project objectives. Any future actions to address preexisting conditions relating to the Alamitos Dam structure that are part of the EIR baseline, should the District decide to pursue such actions in the future, would be planned and developed as a separate project with separate project objectives, and would undergo its own CEQA review. However, the District has designed the proposed Almaden Lake Improvement Project in a way that would not preclude implementation of a future project addressing the Alamitos flashboard dam issues. The Project does not impact or change the way flows are managed from existing conditions. As a result, it is not necessary for analysis of impacts of the project on the environmental baseline condition to include additional details regarding flow management in the EIR. Please see also the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project.
O-004-SCCCC-8	The EIR needs to be amended to include: 1. A substantive discussion of the alternatives recommended by NMFS in 2014 and the variants on the NMFS recommendations provided by numerous environmental groups in 2017 and cost estimates for implementing them.	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project.
O-004-SCCCC-9	The EIR needs to be amended to include:	The comment does not indicate which environmental effects are inadequately addressed without additional information regarding bankfull discharge and proposed

ID	Issue Text	Response Text
	2. A substantive discussion of the calculation of the bankfull discharge and how that impacted the design of the trapezoidal channel the project recommends and why a totally shaded channel was not selected to minimize temperature impacts.	canopy cover. Please see the response to Comment O-004-SCCCC-6 regarding the Project design.
O-004-SCCCC-10	The EIR needs to be amended to include: 3. A discussion of the Regional Board's criteria for temperature impairment and the Regional Board's water quality objectives for temperature and a quantitative estimate of the project's resulting temperatures in light of those criteria, including a summary of existing temperature data collected during the Jones and Stokes 2004 study and more recent monitoring.	As discussed in the Response to Comment O-004-SCCCC-3, the Basin Plan's temperature objectives for surface waters are: • The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses. • The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature. As analyzed in the EIR, the Project would not result in increased temperatures in the receiving water or in a violation of the applicable water quality objectives. Instead, the Project would eliminate Almaden Lake as a source of warming for lake, downstream Alamitos Creek, and downstream Guadalupe River flows, thereby cooling and improving existing surface water temperatures for the benefit of fisheries. In addition, the Project would allow Alamitos Creek water to flow through the Project site unimpeded. Since the Project would simply bypass water from upstream Alamitos Creek in a manner that avoids lake impoundment and warming, it is expected that the proposed Project would reduce temperature in Alamitos Creek and the Guadalupe River through and downstream of the Project area. This beneficial effect is established by qualitative analysis and substantial scientific evidence, and there is no requirement nor need to conduct a quantitative temperature study. The comment suggests that some comparison of flow temperatures to water quality impairment criteria must be included in the EIR to inform a quantitative estimate of the Project's temperature benefits. The criteria used by the San Francisco Bay Regional Water Quality Control Board (RWQCB) and the State Water Resources Control Board (SWRCB) (collectively, the Water Boards) to evaluate temperature impairment of surface waters are irrelevant to a CEQA effects analysis of the Project's fisheries benefits, including the benefit of reducing instream flow temperatures as compared to existing conditions, for several reasons. First, the Water Boards' criteria for determining temperature impairment do not evaluate existing water quality or biological conditions in surface waters within the vicinity of the Project. Instead, the criteria constitute temperature evaluation guidelines drawn from far cooler Pacific Northwest (primarily Washington State) surface waters intended to describe temperature conditions that are most protective of steelhead, and related cold water habitat and migration beneficial uses, without reference to surface water temperatures within central California or to the potential that steelhead present in central California may be adapted to warmer surface water temperatures. Such criteria are used by the Water Boards for developing a 303(d) listing analysis, but do not describe the existing surface water temperature conditions in the Almaden Lake watershed or any other central Coastal California watershed as necessary for purposes of evaluating under CEQA the environmental effects of the proposed restoration Project on existing surface water temperatures and related fisheries conditions. In fact, the statewide Water Quality Control Policy governing the use of such criteria expressly warns that the criteria "**shall only be used for the purpose of developing the [state's federal Clean Water Act] section 303(d) list**

ID	Issue Text	Response Text
		of impaired water bodies." Water Quality Control Policy for Developing California Clean Water Act Section 303(d) List ("Listing Policy"), Section 6.1.1. Therefore, the Water Boards' criteria for adopting a 303(d) listing for temperature impairment is not relevant to the EIR's analysis of potential restoration project effects on surface water temperatures and fisheries conditions in Almaden Lake, Alamitos Creek, or the Guadalupe River. Second, under applicable legal authority, the Regional Board's criteria for temperature impairment are not to be used to regulate surface water quality, and specifically "[the criteria] are not water quality objectives" applicable to surface waters. As demonstrated in the EIR and discussed in the responses above, the Project would not cause or contribute to a violation of applicable water quality objectives for temperature, but instead would cool and improve water quality objectives and the beneficial uses of the surface waters that the objectives are designed to support. Listing Policy, Section 6.1.1. Similarly, narrative water quality objectives will not be translated using temperature evaluation criteria for regulatory purposes, including (though not applicable here) 'for the purposes of regulating point source" discharges of pollutants. Listing Policy, Introduction. Finally, the surface waters that will be affected by this restoration Project are not listed as impaired for temperature at this time, so the Water Boards have not, to date, even properly applied to the surface waters discussed in the EIR even for appropriate purposes that are consistent with the Listing Policy. Third, as stated by the RWQCB in a number of responses to comment on proposed temperature listings in the region, "there is no requirement to utilize any evaluation guidelines selected for 303(d) list assessments as monitoring requirements or triggers in …permits." See, e.g., California State Water Resources Control Board, 2018 California Integrated Report, *Summary of Comments and Responses*, response 12.004 (related to the temperature listing action for Los Gatos Creek) [found at: https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2018_integrated_report.html]. Similarly, there is no requirement to utilize the criteria in any environmental analyses under CEQA. The appropriate analysis for purposes of CEQA is the degree to which the restoration Project might affect (in this case in a beneficial manner) existing (not theoretical) surface water temperature, migration, and related fisheries conditions. That analysis is set forth in the EIR.
O-004-SCCCC-11	The EIR needs to be amended to include: 4. A discussion of the flow regime resulting from project implementation including the ability of the flow regime to achieve protection of beneficial uses.	The comment does not indicate which environmental effects are inadequately addressed without additional information regarding flow regime. The Project would not alter the flow regime of Alamitos Creek.
O-004-SCCCC-12	The EIR needs to be amended to include: 5. A discussion of the findings of the Regional Board with respect to the unaddressed impacts of the flashboard dam and a proposed monitoring plan including a schedule for revising the model capable of predicting expected temperatures and comparing those with standards of impairment established by the Regional Board.	The "unaddressed impacts of the flashboard dam" are not impacts of the Project, rather they are part of the baseline condition. The Draft EIR is focused, as required by CEQA, on impacts resulting from implementation of the Project. Please see the Master Response on Option 8 regarding the decision to limit the Project to the footprint of Almaden Lake. Please see the response to comment O-004-SCCCC-10 regarding the impropriety of the commenters suggested that the Water Boards' Clean

ID	Issue Text	Response Text
		Water Act Section 303(d) impairment listing criteria should be used for the CEQA effects analysis of the restoration Project.
O-004-SCCCC-13	The EIR mentions the Regional Water Quality Control Board's Basin Plan Amendment for Mercury adopted in 2008, but makes no mention of key water quality objectives for temperature contained in the Water Quality Control Plan. Given the temperature has been indicated as a significant stressor in the Study Area and Project Site and given that temperature reduction is considered an important benefit to the project, the EIR should summarize the basin plan objectives for temperature and the recent March 2019 determination by the Regional Board that 17ºC is the 7 day average not to be exceeded to be protective of beneficial uses related to the protection of steelhead trout.	As discussed in the Response to Comment O-004-SCCCC-3, the Basin Plan's temperature objectives for surface waters are that: • The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses. • The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature. The Water Boards recently used the 17ºC 7-day average temperature as one of the temperature criteria to determine if specific waterbodies should be listed pursuant to the statewide Listing Policy on the Clean Water Act section 303(d) list as impaired by temperature (such as was determined for lower Los Gatos Creek). The Listing Policy expressly provides, however, that these criteria do not constitute water quality objectives or other Basin Plan regulatory requirements and should not be used for any purpose other than considering Section 303(d) listings for impairment. See response to comment O-004-SCCCC-10. The Project would not result in violation of the applicable temperature water quality objectives. The Project would eliminate Almaden Lake as a source of warming, improving surface water temperatures within and downstream of Almaden Lake as compared to existing conditions, and would allow Alamitos Creek water to flow through the Project site unimpeded. Since the Project would simply allow flows to bypass impoundment within Almaden lake, flow characteristics, including temperatures, in upstream Alamitos Creek upstream of the lake would make their way directly to downstream reaches of Almaden Creek unaltered and at the same temperature. Accordingly, there is no need to conduct a quantitative temperature effect study.
O-004-SCCCC-14	The EIR has provided no data or analysis to support the conclusion that operation of the project will not violate water quality objectives and will not conflict with the Basin Plan. The EIR has not even described the requirements of the Basin Plan with respect to temperature nor has it even made mention of the Regional Board's March 2019 determination that 17°C as a 7 day average is the appropriate criteria for protection of steelhead trout. Neither has it summarized readily available temperature data nor compared it with the Regional Board's basin plan nor the 17°C criteria. In fact, readily available temperature data not included in the EIR make the opposite conclusion. (See field data collected in the attached 2004, Jones and Stokes report, "Simulated Water Temperature of Bypassing Lake Almaden", and raw temperature data (attached) collected by the Water District subsequent to the Jones and Stokes study.) Those data show that conditions in the Study Area downstream of the Project Site are at levels that exceed Regional Board action levels and the Jones and Stokes report concludes that a fully shaded channel in the Project Site is insufficient to reduce temperatures to below those action levels unless the shaded channel is extended to the Alamitos Drop Structure. The EIR should summarize the available temperature data and compare with the Regional Board's temperature criteria for protection of steelhead trout as well as the	Please see the response to Comments O-004-SCCCC-3, O-004-SCCCC-4, O-004-SCCCC-10, and O-004-SCCCC-13. The Basin Plan objectives for temperature have been added to the EIR and are presented in responses to Comments O-004-SCCCC-3, O-004-SCCCC-10, and O-004-SCCCC-13. The EIR analysis is based on substantial evidence and properly concludes that not only would the Project comply with the legally applicable temperature water quality objectives, but also the Project would eliminate Almaden Lake as a source of warming, and allow Alamitos Creek water to flow unimpeded through the Project site, benefitting existing surface water temperatures and fisheries conditions. The 17ºC 7-day average temperature is not a water quality objective or other regulatory requirement of the Basin Plan, and pursuant to the statewide Listing Policy, should not be applied for any purpose other than considering 303(d) listings for impairment of surface waters. No surfaces waters within the watershed affected by the Project are listed for such an impairment. The Regional Board has not granted the Project a 'defacto exemption' from the Basin Plan and the Project would fully comply with Basin Plan objectives and improve existing conditions for steelhead and fisheries habitat.

ID	Issue Text	Response Text
	higher criteria suggested by Water District staff. Even though the Regional Board staff may have defacto exempted the project from compliance with the Basin Plan, that does not obviate the need for the EIR to objectively evaluate environmental conditions in comparison to Basin Plan temperature objectives and Regional Board action levels.	
O-004-SCCCC-15	The CEQA guidelines are explicit that alternatives need to be analyzed so as to "evaluate the comparative merits of the alternatives and include sufficient information about each alternative to allow meaningful evaluation, analysis and comparison with the impacts of the project." The EIR does not meet that minimum threshold. The essence of the Alternative 8 suggestions by NOAA Fisheries was the ponded backwater be replaced by a flowing stream. Though it did suggest removal of the dam, the District received letters from several environmental groups including the Sierra Club and the Creeks Coalition suggesting the same basic concept but achieving it by modifications to the drop structure, not its removal. These variants were presented to the SCVWD Board of Directors Capital Improvement Committee in January 2017 and project design staff were well aware of these letters. (See attached). The essence of those alternatives was that the flashboard dam be discontinued so as to eliminate the ponded backwater, and conversion of the channel back into stream with riffles and shaded banks and habitat complexity to support steelhead trout. This variant of alternative 8 would also involve notching of the dam to promote coarse sediment movement. There are numerous ways to achieve this, such as: 1. Creating an upstream catch basin to transfer reservoir releases into the percolation pond using a pipeline similar to that proposed to carry Lake Almaden water to the Percolation Ponds or in conjunction with that pipeline. 2. Designing the low flow channel so that flows that topped the banks of the low flow channel would flow into a catch basin for pumping to the percolation pond. 3. Diverting part of the flow released to the channel from the reservoirs into the New Lake Almaden for transfer to the perc pond 4. And for each of these sub alternatives, creating flow conditions that complied with the Streambed Alternation Agreement for flows to be maintained downstream of the Alamitos Drop Structure. There alternatives warrant examination in order to the CEQA guidelines because of the significant environmental impacts that the EIR has also failed to examine.	Please the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project. The variants discussed here would all involve expanding the construction footprint which would increase construction related impacts such as dust generation, air pollutant emissions, greenhouse gas emissions, energy use, noise, and truck trips from the additional construction equipment needed for grading and hauling; aesthetic impacts to the channel; and impacts to nesting birds, trees, and unknown cultural resources, that would be required to integrate the larger project area. They would also not reduce any significant impacts of the Project, and represent a different, more expanded project, with different objectives; however, under CEQA, the District has considerable discretion to identify and pursue a particular project designed to meet a particular set of objectives. For these reasons, these variants are not valid CEQA alternatives meriting detailed analysis in the EIR. It is not clear what unexamined significant impacts the final sentence is referencing. The Draft EIR disclosed all significant impacts resulting from implementation of the Project and provided substantial evidence to support findings that other impacts were less than significant. As discussed in response to Comment O-004-SCCCC-3, O-004-SCCCC-4, and O-004-SCCCC-13 the Project would not result in significant impacts to water temperature.
O-004-SCCCC-16	The EIR cites the following justification for rejecting Alternative 8: 1. Does not reduce any of the significant environmental impacts of the Project 2. Beyond the scope and budget provided by the District's Board 3. Downstream loss of potentially jurisdictional waters of the U.S. 4. Uncertainty about feasibility of alternate water diversion system **1. Significant environmental impacts**	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project. The Project would not result in significant impacts to water temperature or related impacts to native fisheries, see response to Comment O-004-SCCCC-3, O-004-SCCCC-4, O-004-SCCCC-10, and O-004-SCCCC-13. Existing pre-Project temperatures are part of the baseline condition. An EIR need not consider an

ID	Issue Text	Response Text
	As discussed above, to support the assertion that Alternative 8 and its variants would not reduce any of the significant environmental impacts of the project, the EIR must analyze the temperature data in light of Regional Board Basin Plan criteria and sensitivities of steelhead trout to experienced temperatures and the Regional Board's threshold for protecting water quality needed to support steelhead trout life cycle. The EIR as written has not even discussed these issues, must less analyzed them. **2. Beyond the Authorized Scope and Budget** The statement that examining alternative 8 and its variants "is beyond the scope and budget provided by the Board" flies in "double speak" because the reasons that the scope and budget is beyond the Board authorized is because staff opposed the recommendations to include this within the scope. This is documented in the attached memo of Garth Hall in response to these recommendations made to the Board of Directors Capital Improvement Committee. **3. Downstream Loss of Jurisdictional Waters** The greatest loss of jurisdictional waters is the reduction of the footprint of Lake Almaden from 32 acres to 17 acres. The reduction of wetlands by converting the seasonal backwater to a stream as proposed by Alternative 8 and its variants is minor relative to the major impact within the project site. In both cases, the project can be self-mitigating by removing a major obstacle to the sustenance of steelhead trout and enhancing the value of the stream wetlands. In the Regional Board's findings that of jurisdictional waters - but rather as the restoration of creek and riparian area. There is no reason to assume that the conversion of pond to creek and riparian habitat in the downstream reach would be treated any differently. **4. Uncertainty about feasibility of alternative water diversion system** The EIR cites "uncertainty" in this context as if it were an intrinsic quality of the project site and study area. But in fact, the reason that uncertainty still exists is because staff have spent the last four years refusing to apply their engineering skills to address those uncertainties and come up with a coherent well throughout and substantiated engineering conceptual design, cost estimates, and impact analysis. The EIR is incomplete without a thorough examination of these alternatives. The EIR should address those uncertainties and come up with a stage 2 project design compatible with the current project.	alternative that addresses preexisting problems that are part of baseline, but do not address the proposed project's significant environmental impacts. *In re Bay-Delta*, 43 Cal.4th (2008) 43 Cal.4th 1143 1167–1168. Option 8, or the variants suggested in Comment O-004-SCCCC-15, do not reduce the environmental impacts created by implementation of the Project. As noted in the comment and in the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative), the suggestion to expand the Project footprint to include changes at the Alamitos drop structure was brought to the Board of Director's Capital Improvement Committee in 2015. As with all items that go to the Board, and Board Committees, a written report and recommendation is provided by staff. The Board is free to accept the staff recommendation or make any other decision. In this case, the Board, as decisionmaker for the CIP accepted the staff recommendation to maintain the proposed Project scope and estimated budget. The selection of CEQA alternatives is not focused on maximizing ecological benefits, rather it is focused on minimizing adverse environmental effects of a proposed Project. The downstream loss of jurisdictional waters is another example of how project impacts would expand with an expanded project. An expanded restoration project would likely provide better ecological benefits, but would also have more direct impacts to jurisdictional waters. The uncertainty of an alternative water diversion system to maintain groundwater recharge in the Alamitos and Guadalupe Ponds was provided as an example of the additional time, money, and effort that would be necessary to remove the drop structure. Any alteration of the existing diversion structure would require alteration of the related water right with the State Water Resources Board, a multi-year process that would add uncertainly to the District's water rights. A new diversion structure would include its own impacts; any type of in-stream diversion structure that ponds water could result in similar impacts to those the proposed Project is designed to address. While these issues could likely be overcome given enough time, money, and resources, ultimately the District must decide on the scope of its projects given competing priorities for available resources, and has considerable discretion to identify and pursue a particular project designed to meet a particular set of objectives. The District has the funding to pursue the project at Almaden Lake, which would provide benefits to water quality and fish habitat. Unfortunately, it does not have unlimited resources to pursue all potential restoration projects. The Project does not preclude future actions to restore the Alamitos drop structure as a separate project.
O-004-SCCCC-17	The EIR asserts that the low flow channel constitutes a geomorphically stable channel and implies that the design is based, in part, on a calculation of bankfull discharge. The resulting design does not resemble good hydrogeomorphic design but rather reflects traditional trapezoidal channel flood control and sediment transport design, a 25 foot bottom with sloping sides and a 45 top of bank width.. This is not appropriate for the restoration of ecological functions at Alamitos Creek in the project site or downstream. In fact, this is not consistent with the bankfull recommendations of the District's 2016 report cited in the EIR which recommended the following design.	This comment does not reference a specific environmental impact analysis alleged to be inadequate but rather is focused on design of the restored channel. The Draft EIR included design and other information that was available at the time of its public release, and the Draft EIR provides information sufficient for allowing meaningful analysis of the Project and evaluation of Project alternatives. If the Project is approved, the design will progress, and the District will work with the resource agencies in finalizing the restoration plans. As described in Impact 3.K-1, the restored creek channel would be designed to have a stable geomorphic channel with a riffle-pool-run pattern, designed to neither

ID	Issue Text	Response Text
	Also, the EIR describes the channel as a shaded channel, but a narrow band of trees at the top of a 45 foot wide channel does not make for a shaded channel. The EIR should clarify the width of the vegetation strip, the species of trees, the height of trees and estimate the percent canopy and the percent unshaded stream that the proposed design will achieve. The promise of "natural flood control" was that there would be shaded riparian low flow channel with a flood bench for flows that exceeded bankfull and a flood plain for the 100 year flood event. The EIR should examine the costs and benefits and engineering basis for a smaller shaded low flow channel and flood bench and flood plain of appropriate elevation. The EIR should note the dimensions of the low flow channel upstream of the project (13'-20') and indicate whether or not this is indicative of the dimensions of the natural low flow channel. From the cross section drawing in the EIR, the "riffle" cross section has a low flow channel 3-5' wide but the 35' wide on average channel that surrounds it is too large for a bankfull flow and would convey almost 1000 cfs at 5 feet per second velocity, rather than 600 cfs bankfull flow calculated by Larry Johmann some years ago. This bankfull channel would be about 3 feet deep and allow ford a flood plain and flood terrace.	aggrade nor degrade for the entire length of the restored creek section. Channel design is informed by two technical analyses developed by the District: Alamitos Creek Draft Sediment Transport Technical Memorandum (2017) and Alamitos Creek Bankfull Discharge Technical Memorandum (2016) (page 3.K-24). The current preliminary design includes a typical riffle section has a 30' top of bank width and 25' bottom that contains a smaller low flow channel (5' top of bank, 3' bottom, 1' depth) that is almost identical to what is shown in the Alamitos Creek Bankfull Discharge Technical Memorandum (2016). The aforementioned Alamitos Creek Bankfull Discharge Technical Memorandum states, "In typical pool locations, or other locations, the water depth might exceed 1' without any need for low flow channel. In general, the design should focus on ensuring that 1' of water depth can be maintained with a flow of 8.4cfs. The design team should experiment with different configurations while modeling to ensure the minimum water surface." The project hydraulic and hydrological models and low flow channel design would be refined per the guidance in the aforementioned technical memorandums and other restoration engineering design guidance should the Project be approved by the District Board of Directors and design progress. If the project is approved, the project design would advance to include specific features to provide beneficial habitat for all steelhead life stages. Habitat features would likely include boulders, large woody debris, and backwater alcoves. The District is looking forward to working with the resource agencies to implement these project details. The current lack of these specific details does not affect the adequacy of the environmental evaluation of the Project provided in the EIR. The design is also meant to mimic the reach upstream of the Project area. Alamitos Creek upstream of the Project has a similar width and low flow channel as the Project design, and it is noted that vegetation in this reach provides substantial cover of Alamitos Creek. Although riparian shading can reduce temperature over long distances, it can also reduce primary production which fuels the food chain. Even in a full open channel with no shading there would likely be little or no temperature increase over the 1,800 lineal feet of restored channel and flow temperature and migratory conditions would still improve. A detailed landscape restoration plan would be prepared should the Project be approved and design progress.

NOTE: Attachments to the Santa Clara County Creeks Comment Letter (included as Attachment G-1 of this Appendix) were reviewed in providing responses to these comments.

ID	Issue Text	Response Text
O-005-SCLP.SCVAS-1	1. Nesting birds Impact 3.D-1 proposes, "Construction or operation of the Project could have a substantial effect on special-status birds, common nesting migratory birds and raptors, and roosting bats in the Study Area". Mitigation Measure 3.D-1a focuses on removal of vegetation. However, on the Island and around Almaden Lake, many bird species nest on the ground, or in cavities in the ground - including Mallard, Canada Goose, Common Merganser, California Quail, Pied-billed Grebe, Spotted Sandpiper, American Coot, Common Moorhen, Northern Rough-winged Swallow, and Belted Kingfisher (Reference: Breeding Bird Atlas of Santa Clara County. William Bousman, Santa Clara Valley Audubon Society, 2007). • Please provide mitigation for disturbance to nests of ground nesting species during construction. • Please provide mitigation for impacts due to operation of the Project. o We recommend the prohibition of public access to the islands to avoid trampling and disturbance, and to mitigate potential impacts to roosting and nesting birds. o To minimize disturbance of resting or nesting birds, we recommend prohibition of boating within S0-yards of the island shores. o Please prohibit dogs on the levee between the new lake and Los Alamitos Creek.	EIR Impact 3.D-1 includes all nesting migratory birds, which extends to ground nesting species and discussion of removal of vegetation extends to ground surfaces. As discussed, The District implements BMP BI-5, Avoid Impacts to Nesting Migratory Birds, and BI-6, Avoid Impacts to Nesting Migratory Birds from Pending Construction, to determine if active nests are located with the Project footprint and avoid impacts, including nests of bird species that nest on the ground or in cavities. These measures would apply to all species listed in the comment and together with existing state and federal regulations reduce the intensity of impacts on nesting migratory birds and raptors. The loss or disturbance of an active nest would be a significant impact. Implementation of Mitigation Measure 3.D-1a: Nesting Bird Protection Measures would ensure that the Project would have a less than significant impact on nesting birds, including nests of bird species that nest on the ground or in cavities by establishing no work buffer zones around active nests identified on or near the Project area. Regarding potential operational impacts, see EIR page 2-15, New and Expanded Islands. As noted, public access to the islands would be prohibited. The City of San José currently manages boating at Almaden Lake and will continue to do so under the Project. The City would also manage use of the levee trail as an extension of the Guadalupe River Trail. The City would be responsible for establishing requirements related to boating in the proximity of the islands or restrictions on dog use. It is noted that the City does not currently allow off-leash dog use at Almaden Lake Park, and restricts them from the west side of the park (https://www.sanjoseca.gov/Home/Components/FacilityDirectory/FacilityDirectory/2082/2028). The Project would not result in new recreational use types or changes in existing recreation policies that would result in an increase in effects to ground nesting birds as compared to existing conditions.
O-005-SCLP.SCVAS-2	2. Western Pond Turtle DEIR Section 3.D Biological Resources under Project Setting (p. 3.D-2) mentions Western Pond Turtle as a species that may occur on the Project site. Avoidance and Minimization practice #91 proposes ". aquatic species will be netted at the drain outlet when draining reservoirs or ponds to surface waters. Captured native fish, native amphibians, and western pond turtles will be relocated if ecologically appropriate.". The EIR provides no mitigation for take of Western Pond Turtles. To adequately mitigate for impact to individuals and to habitat, please: • Provide a Western Pond Turtle relocation Plan. • Provide training so project personnel can identify Western Pond Turtles and know what to do if they encounter a turtle. • The Western Pond Turtle relocation Plan should include plans for the draining of the lake, including the potential need for pumping water. Also, during the draining of the last 1/3 of the water volume in the lake, consider daily sunrise survey for Pond Turtles along the entire perimeter of the lake to check for out-migrating Western Pond Turtles, or turtles digging hideouts or stuck in the mud. • Mitigation and best practices to minimize impacts to Western pond turtles should include Habitat enhancements:	As discussed on EIR page 3.D-12, western pond turtle was not observed during the reconnaissance level field survey and wetland delineations conducted for this Project. While, this species is known to occur in Guadalupe River north of the Study Area, in the main channel approximately 0.2 mile downstream of Almaden Expressway bridge, nonnative predatory fish and competition from nonnative turtles, such as red-eared slider (*Trachemys scripta elegans*) and yellow bellied slider (*Trachemys scripta scripta*) could limit the occurrence of western pond turtle within the Study Area. Impact 3.D-2 indicates that although western pond turtles are known to nest and migrate through the Study Area, the high degree of human disturbance from ongoing and past uses has resulted in the upland dispersal habitat being of marginal quality. However, if present, this species could be directly or indirectly affected during Project construction. Substantial direct impacts to western pond turtles foraging, experiencing thermoregulation, nesting, and avoiding predators within creek and river banks and lake island vegetation could result from proposed water diversion or dewatering, vegetation and debris removal, pipeline installation, and excavation. Similarly, levee construction, re-contouring, and open park area construction could directly impact turtles basking or migrating through non-canopied parklands or indirectly through increased noise and vibratory activities within the Study Area. Construction would be subject to SCVHP Avoidance and Minimization Measures which are designed to minimize impacts to aquatic reptiles. These measures include

ID	Issue Text	Response Text
	○ Submerged Wetland Benches. To provide cover, foraging, and nesting opportunities for wildlife, including hatchling and juvenile Western pond turtles, wetland benches can be integrated into the design of the levees and incorporated into the grading plans for the islands. These features should be at an optimum elevation/water surface depth for emergent wetland plant species to grow and propagate (approximately 0 to 2 feet below the water line). Wetland benches varying in width from approximately 8 feet to up to 30 feet from the islands will also serve to deter boats from approaching the islands and contribute to reducing erosion. ○ To benefit wildlife species such as pond turtles, waterfowl, and shorebirds, basking logs, basking zones, nesting zones, and raptor perches can be installed along the shoreline and on the islands. Pavers, stones, and gravel should be installed on roughly 6 foot by 10 feet sections along the islands shorelines to serve as turtle basking zones and to facilitate maintenance access. Portions of the islands can be amended with sand to encourage turtle nesting.	preconstruction surveys, biological training, decontamination practices, monitoring of construction activities that may impact suitable habitat, and upholding regulatory agency permit obligations. Impacts to western pond turtle are less than significant with the implementation of SCVHP conditions and Avoidance and Minimization Measures. The relocation plans suggested by the Commenter are fully covered by the requirements of the SCVHP. Regarding the suggestions that the Project include habitat enhancements, the Project purpose is to restore Alamitos Creek's function within the footprint of Almaden Lake Park in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint, and minimizing impacts to existing recreational features within the Park. The Project does not directly include habitat enhancements for western pond turtle; however, restoration of Alamitos Creek within Almaden Lake Park could indirectly improve habitat in the area by extension. Large woody debris and boulders that are planned for the restored creek to benefit native fish would provide basking habitat for turtles. In Almaden Lake, the emergent vegetation that would be installed as part of the restoration planting going around the islands and fringes of the lake would provide suitable habitat for turtles as well.
O-005-SCLP.SCVAS-3	3. Islands • The expanded existing island is positioned very close to the trail and thus it is likely to become accessible to swimming predators including domestic dogs. Please widen the water channel between the island and the levee, even if that means that the island will be smaller.	As noted in response to Comment O-005-SCLP.SCVAS-2, the City does not currently allow off-leash dog use at Almaden Lake Park, and restricts from the west side of the park. It is speculative to assume that unauthorized off-leash dog use would occur and would occur at levels greater than under existing conditions, and that such use would result in substantial predation on bird species utilizing the islands. Note that the existing island, which supports nesting birds, is a similar distance to the lake shore.
O-005-SCLP.SCVAS-4	4. Source of water and drought conditions • The discussion of existing conditions does not explain the existing source of water to Almaden Lake or what percentage of that water is imported water compared to 100% imported water to be used for the Project. Please add this information. Also add some information about nutrients in imported water under Hydrology and Water Quality Operations Impacts on page 3.K-23 where it is not mentioned at all. • Imported water from the Delta is high in nitrates and susceptible to Harmful Algal Blooms (HABs). Please discuss in project description the possible increase in nitrate concentrations (and any other water quality issues that may be introduced) due to the use of imported water, and discuss the impacts on water quality in the Lake (especially the potential for HABs) and mitigations needed in section 3.K Hydrology and Water Quality. • The Project is projected to use 4,350 AFY of imported water. Please discuss the impact of this new demand on imported water in the project description or in Section 3.P Utilities and Service Systems as appropriate. How will this diversion of imported was impact the distribution of imported water and amount of imported water used (especially under drought conditions). • Discuss the impact on the Project in the event of an extended drought up to 6-year drought period analyzed in the Water Supply Master Plan. How will this	Please see EIR page 3.K-2, which notes that Almaden Lake is located at the downstream end of the seven-mile-long Alamitos Creek and its tributaries, including Calero Creek, which receives flow from Almaden and Calero Reservoirs. And further notes that Almaden Lake is currently replenished by Alamitos Creek flows, direct precipitation, and limited stormwater runoff from adjacent areas. Under existing conditions imported water can be stored in Calero Reservoir and released downstream; imported water can also be released directly into Alamitos Creek where it is typically captured at the Alamitos drop structure and directed to the Alamitos Percolation Pond. These releases are highly variable depending on local hydrology and available overall water supplies. Regarding nutrients, see Draft EIR Page 3.K-22. As discussed, algae concentrations in the lake are likely to decrease with implementation of the Project, because the sediment removal and clay cap would substantially reduce the amount of nutrient rich organic matter in bottom sediments. Local nutrient sources, including waterbirds and urban runoff, would continue to contribute nutrients to the lake. Nonetheless, reduced nutrients available from bottom sediments would reduce the total nutrients available to support algal productivity as compared to existing conditions. During summer periods, continuous input of at least 7.5 cfs of Almaden Pipeline water to the system would help to ensure that the lake maintains a flushing rate/water residence time of approximately once per 20 to 35 days, which is generally consistent with or better than existing conditions, helping to reduce temperatures and minimize

ID	Issue Text	Response Text
	impact Lake levels, flow through the Lake, and therefore the ability of the project to meet objectives in this situation?	stagnation of the water body. During winter periods, water residence times would be longer than typical existing conditions. Nonetheless, harmful algal blooms are not expected to occur during these periods due to reduced water temperature, lower light levels, and reduced nutrient source from bottom sediments. Therefore, the Project is expected to generate a net reduction in algal concentrations and a net reduction in bloom conditions during Project operation. Regarding imported water availability, see Draft EIR page 2-15 and 2-16. As discussed, the proposed flow-through water management system would provide a continual flow of water through Almaden Lake to improve water quality. The flow-through system would circulate approximately 7.5 cfs of water through the lake from May through September, and about 5.0 cfs during October through April, equivalent to approximately 4,350 AFY that would pass through the lake provided that there is sufficient imported water available and capacity in Alamitos Percolation Pond. No changes to District water rights would be required to implement this system. There could be times when the District would not be able to provide Almaden Valley Pipeline water to Almaden Lake, including due to drought conditions, insufficient imported water supply, periodic system maintenance, or higher pressing water supply needs elsewhere in the Santa Clara County. During drought periods when there may be insufficient imported water to supply the lake, the District may temporarily suspend pumping lake water to the percolation pond. However, as discussed on Draft EIR page 3.K-22, water loss in the lake is expected to be minimal due to evaporation and water would not become stagnant and temperature would not be expected to increase substantially, and therefore, harmful algal blooms would not occur during these periods. During the recent extended drought from 2012 through 2016 water supplies were inadequate to provide releases from upstream reservoirs to reach Almaden Lake and there was no flow through the lake. The lake surface elevation did not drop substantially during this period, and a similar outcome could be expected in an extended drought under the Project conditions. As discussed in Section 3.P, using water from the Alamitos Pipeline to fill a separated Almaden Lake would not impact water supplies as this water will be circulated to the Alamitos Percolation Pond for groundwater recharge.
O-005-SCLP.SCVAS-5	5. <u>Impacts on Sycamore Terrace property</u> The identified staging area and pipeline location on the City's Sycamore Terrace property may impact the riparian corridor and significant vegetation and therefore we request the following changes to the analysis related to the use of this property in the DEIR as follows: • On Figure 2-2b which shows the staging area boundaries, update the boundary of the Sycamore Terrace staging area so it doesn't not encroach into the 100' setback from top of bank. Also, include language In the project description stating that no trees will be removed on this property. There should be no reason to remove trees for a staging area (see Santa Clara Valley Habitat Plan Avoidance and Minimization Measures, #49). • Figure 2-5 which shows the location of the pipeline from Almaden Lake to the Los Alamitos Percolation Pond going through the middle of at least one Sycamore grove. Figure 3.D-1a which shows the study area along the west edge of this property doesn't not appear to include the Sycamore grove. Please update Figure	The EIR Project Description has been revised to remove consideration of the Sycamore Terrace property as a staging area. EIR page 2-50, paragraph 3 has been revised as follows: Construction staging areas include Almaden Lake, the southwestern lawn area of Almaden Lake Park, ~~the vacant property owned by the City of San José also known as the Sycamore Terrace property,~~ and the District's Winfield Warehouse (Figure 2-2). The bed of Almaden Lake would contain construction access and staging areas. As construction activities progress, lakebed staging areas would be relocated within the bed of the lake as different areas of the Project site need to be accessed. Outside of the lake bed, other potential staging areas include the southwestern lawn area of Almaden Lake Park~~, the Sycamore Terrace property located at the northeast corner of Almaden Expressway and Coleman Road,~~ and paved areas (parking, storage areas) at the District's Winfield Warehouse, located to the north of Coleman Road, along Winfield Boulevard. ~~Use of the Sycamore Terrace property for staging would be coordinated with the City of San José.~~

ID	Issue Text	Response Text
	2-5 to move the location of the pipeline into the study area shown in Figure 3.D-1a. • The revegetation plan on Figure 2-6 does not include any mitigation planting on the Sycamore Terrace property. Please expand the revegetation plan to include this property and provide mitigation for the impacts caused by using this property as a staging area. • In general the potential impacts to this property have not been adequately addressed in this DEIR. For example, will the use of the property as a staging substantially alter the drainage pattern and cause increased surface runoff or erosion? Please make sure to analyze and mitigate all impacts at the Sycamore Terrace property. • All mitigations to prevent damage to the riparian habitat and floodplain and to water quality at this confluence point are essential. Please add language to clarify that all water quality and hydrology mitigations apply to equally to this property. • The impacts of horizontal drilling at the Sycamore Terrace property need to be discussed and mitigated. Please provide information, analysis, and mitigation to respond to the following questions. What will be the impact of placing and operating the large drilling rig and where will the rig be placed? What will be the impact of drilling noise and vibration? How will materials or waters generated during drilling be stockpiled? Please include this boring project in the discussion of Best Management Practice WQ-12 since it is not currently mentioned there.	EIR Figure 2-2b has also been revised to remove the parcel. Please see the response to comment S-001-CDFW-2 regarding impacts associated with horizontal drilling. The pipe would cross underneath the Sycamore Terrace property at depths greater than 20 feet below the ground surface via microtunneling. At this depth, there would be no substantial impact to the trees or other features on the property. The drilling rigs for microtunneling would be placed in the Almaden Lake Park parking lot and in the parking lot of the District headquarters, and there would be no surface activity on the Sycamore Terrace property. As there would be no staging or disturbance on the property, there is no need for mitigation planning, additional analysis, or other restoration activities on the Sycamore Terrace property. EIR Impact 3.L-1 discusses the anticipated noise levels at sensitive receptor locations for all construction phases, including construction of the transfer pipeline to Alamitos Percolation Pond, which includes horizontal directional drilling. As discussed, the sound intensities associated with construction activities would be below the FTA threshold for construction noise and the impact from construction noise would be less than significant. Similarly, project-related construction would not generate excessive vibration and groundborne noise exposure in the Project vicinity (Impact 3.L-2). The discussion of pipeline construction has been expanded in the Project Description regarding control measures that would prevent slurry water from entering waterways (see Section 2.3.2, Construction Phases). The control measures would include training of construction personnel, methods for preventing accidental release (including maintaining pressure in the borehole and continuous monitoring of slurry volumes at the exit and entry pits), clean-up requirements, and notification requirements. All activities, including microtunneling, are subject to BMP WQ-12.
O-005-SCLP.SCVAS-6	6. Lighting Artificial night lighting has an adverse impact to all living things, and interferes with biological processes in wildlife, including fish and birds. The DEIR dismisses Project impacts due to light and glare since the Project has no development elements that would generate lighting during operations, and "Security lighting would not be required beyond what is already present in the Park." However, it is reasonable to expect that lighting will be part of the new planned park area, and that there will be an interest in the community to add sport lighting, lighted art, and other additional lighting features and elements. • To avoid or minimize impacts of future lighting development, the EIR should specify that lighting will not permitted on the new levee, and require mitigation for potential future park lighting to prevent light trespass into habitat areas.	The District does not intend to provide lighting on the levee. As discussed in response to Comment O-005-SCLP.SCVAS-1, the City of San Jose operates that park and will manage the levee trail and new park area developed under this Project. The park is currently restricted to day use only, from sunrise to an hour after sunset (https://www.sanjoseca.gov/Home/Components/FacilityDirectory/FacilityDirectory/2082/2028). No lighting of the proposed new recreation areas is included in the Project and security lighting would not be required beyond what is already present in the Park (EIR page 2-15). The Project does not include sports fields, or other elements that may require lighting, and it is speculative that such future uses would occur. However, should the City of San Jose consider such uses in the future, the proposed use and any associated lighting would be subject to consideration as a separate Project under CEQA.
O-005-SCLP.SCVAS-7	7. Tree removal • More information is needed to fully analyze the impacts of tree removal. Please include a figure with a site plan showing all tree removals planned within the study area, including at the Sycamore Terrace staging area. Mitigation planting for tree Removal Plan should be provided on the Planting Plan, especially for the Sycamore Terrace property as indicated under #5 above.	This comment notes that more information is needed to fully analyze the impacts of tree removal, but does not indicate how or why the analysis presented is insufficient. EIR Impact 3.D-6 discusses potential for the Project to conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. The Project would remove approximately 81 to 95 trees to accommodate Project construction. The trees that may be removed are located around the lake perimeter, as it is conservatively assumed based on preliminary project planning, that most trees adjacent to the lake would be removed during construction activities.

ID	Issue Text	Response Text
		The District would obtain written authorization or permit for removal or potential damage of all trees if required pursuant to the City of San José Municipal Code. In addition, the Project would implement tree protection and replacement requirements if required by the City. Therefore, tree removal would be a less than significant impact. The Project could also indirectly impact trees subject to the City Code through inadvertent limb and/or root damage. Such damage could lead to tree mortality after Project construction is completed, which would conflict with the City Code, plans, and guidance related to trees and would be considered a significant impact. Implementation of Mitigation Measure 3.D-6 (Tree Protection Measures) would ensure the Project protects trees that promote the health, safety, and welfare of the city from inadvertent damage, and reduce the Project's potential for conflict with City of San José tree codes, plans, and guidance to less than significant with mitigation. As Sycamore Terrace has been removed as a site for staging, and no activities are proposed on this property, there is no requirement for mitigation plantings. See the response to Comment O-005-SCLP.SCVAS-5 regarding the Sycamore Terrace parcel.
O-005-SCLP.SCVAS-8	8. <u>Impacts of dewatering</u> • To minimize the impact of dewatering, add a mitigation measure to provide retention, infiltration and evaporation outside of construction areas either onsite or at another location near the Project site. This approach will provide source control to minimize negative impacts on water quality.	Impact 3.K-1 addresses the potential for construction activities (including dewatering activities) to violate water quality standards or waste discharge requirements, conflict with or obstruct implementation of the Basin Plan, or otherwise substantially degrade surface or groundwater quality. During the construction process, Almaden Lake would be drained to allow access to the lake bottom. Draining of the lake would require discharge of lake waters into downstream areas of Alamitos Creek and the Guadalupe River. Discharge of lake waters into Alamitos Creek is generally not anticipated to cause a reduction in water quality downstream, in comparison to existing conditions, because lake waters are already discharged downstream under existing conditions. However, when the lake is drawn down to near bottom, potential mixing of waters with bottom sediments could result in the release of increased sediment loads. Lake bottom sediments are known to contain high concentrations of mercury. In addition, after drawdown of the lake is complete, groundwater dewatering may be required to establish and maintain a dry lake bed to provide a working surface for the construction equipment which could release sediment, mercury, and other potential water quality pollutants to downstream areas. Releases of water containing elevated concentrations of sediment could therefore also contain elevated mercury levels, resulting in a significant impact related to downstream water quality degradation. Implementation of Mitigation Measure 3.K-1 (Monitor and Manage the Quality of Lake Discharges to Creek) would minimize these effects by ensuring that sediment and/or mercury-laden sediment is not discharged to surface waters. Adherence to this mitigation measure would reduce this impact to less than significant and alleviate potential for conflict with the Basin Plan. Given space and time constraints infiltration and evaporation of lake water is not possible; however, mitigation measure 3.K-1 calls for the use of settling basins, baker tanks, or in-line filters for sediment removal which would fully reduce sediments to Basin Plan standards. Stormwater in upland areas affected by Project construction would be managed in accordance with District BMPs, as well as the requirements of the applicable

ID	Issue Text	Response Text
		Construction General Permit, which collectively would ensure that stormwater would be controlled on site to minimize the release of sediments downstream, minimize stormwater contact with stockpiled materials, provide for rapid revegetation of denuded slopes and other areas, stabilize construction entrances and exits, and other measures designed to minimize construction period release of sediments to downstream. These measures would reduce potential for erosion in these areas. Therefore, substantial releases of sediment to downstream are not anticipated during construction, and this impact would be less than significant.
O-005-SCLP.SCVAS-9	9. Impacts of flashboard dam operation • Please include in the project description how the interaction between Almaden Lake and the Los Alamitos Drop Structure will change as a result of the Project. Will the dammed water still back up into the Lake? Will it back up into the newly separated stream? If it will back up to these areas, please analyze the impacts and provide mitigation as appropriate. Alternative, explain how operation of the flashboard dam be changed to prevent any such impact.	The District does not consider the flashboard dam to be a closely linked facility to the Project Please see the Master Response above (Section G.3.2, Effectiveness of Project Achieving Ecological Goals Related to Fishery Habitat) for a discussion of these issues, and why these comments do not affect the adequacy of the EIR's analysis of the Project's adverse environmental impacts or present new adverse environmental impacts caused by the Project. Please note that the District has designed the proposed Almaden Lake Improvement Project in a way that would not preclude implementation of a future project addressing the Alamitos flashboard dam issues.
O-005-SCLP.SCVAS-10	10. Alternatives Sierra Club has previously proposed an alternative that would include cessation of operation of the flashboard dam at the Alamitos Drop Structure, re-plumbing of the inflow to Alamitos Percolation Ponds, and conversion of the ponded backwater to a flowing stream. By creating a direct pipeline connection from Almaden Lake to the Los Alamitos Percolation Pond, the recommended Project begins to make this recommendation possible. Although that expanded project will not be included in this project, we urge the District to pursue that project in the future, as recommended in a letter to the District from NOAA Fisheries in May 2014.	Please see the Master Response above (Section G.3.1, Consideration of Additional CEQA Alternative) discussing the reasons why Option 8, Expanded Creek Restoration, is not a valid CEQA alternative to the Project. As noted in that response, the proposed Project is designed in a way that would not preclude implementation of a future project addressing the Alamitos diversion dam.

ID	Issue Text	Response Text
I-001-Anonymous-1	The project seems to balance the need for remediation of the methylmercury, the desire of the public for water features, and the aim of preserving water resources for the future. The EIR seems to address the pertinent issues in practical and cost-effective ways.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project and so no response is required. Thank you for the feedback on the EIR.
I-001-Anonymous-2	Valley Water has done a good job of keeping the community informed, and those efforts are appreciated.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project and so no response is required. Thank you for the feedback on outreach to the community.

ID	Issue Text	Response Text
I-002-Armstrong_1-1	The EIR fails to evaluate the most obvious alternative project, which is to use a floating dredge to remove mercury-laden sediments form the lake bottom and transport them to an approved disposal site. Almaden Lake serves a useful purpose, as a sedimentation pond to remove mercury-laden sediments form the natural stream-bed environment. The lake can continue to serve that purpose in the future, as future mercury-laden sediments in the watershed are expected.	As Discussed in EIR Chapter 4, *Alternatives*, the approach to alternatives selection for the EIR focused on identifying alternatives that could meet most of the basic objectives of the project while reducing one or more of its significant impacts, foster informed decision-making and public participation, and could be feasibly implemented. Dredge and removal of sediments would not meet most of the project objectives as it would not separate Alamitos Creek from Almaden Lake, remove potential lake entrainment of anadromous fish, or improve temperature conditions and reduce predation for native fish. Thus, dredge and removal of sediments would not be considered a valid CEQA alternative to the Project. Further, long-term dredge removal would be associated with additional environmental impacts due to ongoing air emissions, as well as long-term recreation and aesthetic resources effects due to the presence of large equipment in the lake and lake banks on a regular and ongoing basis.
I-002-Armstrong_1-2	The EIR fails to address the environmental fate of mercury laden sediments, in the context of the entire watershed. By bypassing Almaden Lake with a newly constructed stream channel, the negative environmental consequences of mercury in the environment would simply.be moved downstream to new locations.	As discussed in EIR Section 3.K, Hydrology and Water Quality, the entire watershed is currently under monitoring to address the mercury present. Also, discussed in EIR Section 3.K is the District's existing water quality monitoring project to address the Mercury TMDL in the Guadalupe River Watershed. The commenter appears to suggest that under current conditions, all mercury content from upstream Alamitos Creek is deposited into Lake Almaden and that flows exiting the lake into downstream Alamitos Creek do not contain mercury. However, as discussed on EIR page 3.K-8, mercury is found in downstream Guadalupe River. Under the Project, the existing source of mercury-laden sediments would be removed from the lake, reducing a potential source of downstream mercury. See Response S-003-RWQCB-5 for a discussion of sediment transport post Project. Sediment carried downstream to the confluence of Alamitos and Guadalupe Creeks. The District already conducts periodic sediment removal under the Stream Maintenance Program at this location to remove mercury-laden sediments from the system before they reach San Francisco Bay. Mercury from upstream areas of the watershed would continue to serve as a potential source of downstream mercury, similar to existing conditions.
I-002-Armstrong_1-3	The EIR identifies historic mercury mining operations as a source of mercury-laden sediments, but fails to identify current ongoing sources, such as mine tailing piles and roads in Quicksilver Park, earth-moving operations at Guadalupe Dump, which intersect and expose historic mining shafts and tunnels, and other general construction.	As discussed in EIR Section 3.J, Hazardous Materials, a comprehensive search of five regulatory databases was completed, and all potential sources of mercury, including Quicksilver Park were identified. Additionally, EIR Section 3.K, Hydrology and Water Quality, identifies and discusses historic and current sources of mercury. Please see the response to Comment I-002-Armstrong_1-2, as noted, mercury from upstream areas of the watershed would continue to serve as a potential source of downstream mercury, similar to existing conditions.

ID	Issue Text	Response Text
I-003-Armstrong_2-1	EIR failed to evaluate dredging alternative	Please see the response to Comment I-002-Armstrong_1-1.
I-003-Armstrong_2-2	EIR failed to evaluate impact of allowing mercury sediments downstream	Please see the response to Comment I-002-Armstrong_1-2.

ID	Issue Text	Response Text
I-004-Barry-1	1. Why is the lake area studied in the EIR so narrow? It focuses on restoring the Alamitos Creek and reconfiguring & cleaning the Almaden Lake Park, and more specifically on plants, flora, trees, fish, turtles, bats, and birds. However, the EIR does not take into account the surrounding natural habitat and animals (i.e. deer, mountain lions, bobcats, coyotes, and other wildlife) who reside in the area.	EIR Section 3.D, Biological Resources considers both direct and indirect effects on biological resources that may result from implementation of the Project. Generally, direct effects would be associated with resources located within the Project study area, and would pertain to direct removal or disturbance of species or habitat. However, the analysis also considers indirect effects, and in particular Impact 3.D-5 considers the potential for the Project to interfere with the movement of any native resident or migratory wildlife species. As discussed, the Study Area is in an urbanized area of San José and is consistently exposed to human disturbance originating from adjacent streets and recreationalists using Almaden Lake Park. Outside of the natural corridors along Alamitos Creek, the Study Area is largely surrounded by built uses, which block migration of terrestrial species. Any wildlife movement in the area is likely habituated to high levels of human activity. The construction phase of the Project could temporarily alter terrestrial wildlife movement or native wildlife nursery site in Alamitos Creek corridor or Almaden Lake, the areas closest to construction activities. It is anticipated that effects on terrestrial wildlife movement in the areas around the lake would be less than that experienced in areas within the study area as the noise and activity associated with construction would diminish with distance. In either case, the area of impact and proposed construction duration would not substantially impact or impede these activities. Suitable movement corridors and habitat for these species are found immediately upstream and downstream of the Study Area.
I-004-Barry-2	Since I live across the street in the Lake View Terrace condo complex, I am very concerned that this will be a massive construction project that will go beyond its 2023 timeline. As it is, we have regular sightings of coyotes and bobcats at our complex.	Please see prior response.
I-004-Barry-3	This project will be a major disruption that will impact all the wildlife surrounding our homes. Why didn't the EIR consider the impact on the surrounding natural habitat?	Please see prior response.
I-004-Barry-4	2. Why do this all project all at once? Why not break into two smaller phases? It seems that the original funding for the project started with restoring the Alamitos Creek. To reduce the impact on the wildlife and surrounding environment, why doesn't Valley Water do this in Phases? For example, Phase 1: Restore the Alamitos Creek; and, Phase 2: Consider options for cleaning up the Lake. At issue is that this is a 3-4 year construction project in an area densely populated and a main traffic throughway used by commuters at Coleman Road and Almaden Expressway. It would make more sense to break it down into two projects thereby minimizing impact on surrounding wildlife, and also, making the project budget & timeline more manageable.	The restoration of Alamitos Creek necessitates the separation of the creek from the lake. To do this the lake must be drained and the bottom of the lake raised to construct a levee. With work already needed in the lake it makes sense to complete all work in the lake during this phase rather than having to drain the lake a separate time. Breaking the project into separate phases would increase costs by requiring multiple start up and clean up phases and would greatly extend the overall period of impacts to the surrounding neighborhoods. As discussed in EIR Section 3.D, construction related impacts to wildlife species are less than significant with the District's Best Management Practices and Santa Clara Valley Habitat Plan measures, which are required impact avoidance and minimization measures. The only exception is the potential for substantial effect on nesting birds and roosting bats, which would be reduced to less than significant levels by implementation of Mitigation Measures 3.D-1a and 3.D-1b. Impacts to nesting birds and roosting bats would not be reduced by two project phases; as these potential effects occur seasonally and adding a second phase of construction would merely move the potential effect to another set of construction years.

ID	Issue Text	Response Text
I-004-Barry-5	3. Timeline and delays -- What contingencies are built-into the capital budget for unforeseen delays? For instance, if there is a drought in the next two years, will filling in the lake with water be delayed or the project be reassessed? Other delays that can impact the project: Valley Water budget cuts, change in SCVW board priorities, rain and weather halts construction, contracts are required to be rebid, and cost overruns result due to unforeseen factors. What contingencies does Valley Water have in place to keep this project aligned with its timeline? Or rather, have such delays been figured into the assumptions that support the project.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. As these issues do not relate to physical impacts, they are not addressed in the EIR. The District regularly constructs large capital projects which are all subject to these concerns. Contingency funds are included in capital budgets and schedules are developed with the expectation of some delays due to weather.
I-004-Barry-6	4. Almaden Lake and other options for removing Mercury contaminated sediment. The lake reconfiguration and clean-up sounds very complex, long, and a mess over multiple years –it also sounds like something Valley Water has not done before. Has Valley Water considered all of the options available to remove mercury sediment in the lake? As I understand, the two solar "bees" did have an impact in removing mercury. It seems like overkill to drain the lake, treat the bottom, and shrink it from 32 acres to 17 acres with construction and restoration taking place over a period of 3-4 years. What other, less impactful options were considered to clean up the lake?	Please see EIR Section 4.D, Alternatives Considered but Rejected from Further Analysis. As noted, the planning process for the Almaden Lake Improvement Project began in 2011. Over the course of the planning effort, the District considered numerous options for the Project in the context of the project objectives, technical feasibility, agency comment, public input, and constraints on implementation. The options included a technology-only option (increased use of solar bees) to address the lake's water quality issues. As discussed, the technology only option would not meet the purpose of the Project to restore Alamitos Creek's stream function within the footprint of Almaden Lake in order to improve steelhead and other anadromous fish habitat. This option would not separate the creek from the lake, remove potential lake entrainment of anadromous fish, nor would it reduce release of Almaden Lake's warm water downstream into the Guadalupe River. This option also would not reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives. As a result, mercury removal options were considered but rejected from further consideration.
I-004-Barry-7	5. Aesthetics – Lake Scenic Impacts & Mitigation Measures (3.A.3). During the public meeting January 8, 2020, the project manager said outright that the area would be disrupted by construction over several years, and there would follow a restoration of the lake park. While the EIR does not take into consideration social or economic impacts, it is hard to separate these issues in the long-term clean-up of the lake.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Social and economic impacts are not addressed in an EIR consistent with state law.
I-004-Barry-8	The lake park is essentially in Lake View Terrace condo owner's backyards. We do not want the geese or seagulls landing near LVT's creeks and ponds. This issue applies not just to LVT but to other condo and residential homes surround the lake. The Lake-portion of the EIR does not take into consideration environmental impacts to the surrounding area.	During project construction, the lake would be drained however, the upland areas around the lake would be available to avian species. However, it is reasonable to assume that avian species may relocate to other nearby areas during construction. Other large, open water areas in the vicinity, including Alamitos Percolation Pond, Los Capitancilos Percolation Ponds, and other nearby operational ponds, are more likely to attract displaced avian species and a substantial increase in visitation to neighboring backyards and properties.
I-004-Barry-9	Nor did it seem like any budget had been established to help redirect "nature from doing what it will do". The Lake-part of SC Valley Water's project requires more study and a less impactful approach. Please reconsider other options for cleaning up the lake.	Please see the response to Comment I-004-Barry-6.
I-004-Barry-10	6. Long Term Almaden Lake Improvement Project Management. Having some experience in managing city construction projects, I can foresee this longterm project could turn into a nightmare for residents, businesses, commuters, and home owners --and ultimately Santa Clara Valley Water District and its Board.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. It is not clear what potential long-term issues are being referenced.

ID	Issue Text	Response Text
I-004-Barry-11	During the Jan 8th Public Meeting, I heard Councilman Johnny Khamis joke that he would not be in office when the project took place. I would guess that many of the people at SCVW who involved in this study and design, will also not be around to see how it ends. Will this project --capital budget, contractors, and timeline --be managed by the same project manager over the term of the project from beginning to construction to restoring plants and trees?	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. The District would be responsible for all phases of construction, restoration, and required monitoring.

ID	Issue Text	Response Text
I-005-Bernard-1	My question is: why is there no accommodation for a new beach to replace the existing one that will be lost and no accommodation for swimming, given all of the aforementioned improvements that protect swimmers' health? Since the bottom of the lake is to be reshaped anyway, it could be done with the appropriate gradients to accommodate a new beach and swimmers.	The District coordinated preliminary planning of the Project with the San José and through that planning, City staff indicated that existing recreation facilities on the east side of the lake should be retained. Thus, sufficient space is not available to include a beach adjacent to the recreated lake under the Project. The proposed Project does not include changes to operation of Almaden Lake Park (such as regarding swimming policies), which is managed by the City of San José. Questions regarding park operations should be directed to the City (https://www.sanjoseca.gov/Home/Components/FacilityDirectory/FacilityDirectory/2082/2028).

ID	Issue Text	Response Text
I-006-Brock-1	Does Valley Water already have the 36 million dollar cost set aside or will citizens be surcharged for some?	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Funds for the construction of the Project have been allocated.
I-006-Brock-2	What assurance do we have that entire project will be completed?	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. The District would be responsible for all phases of construction, restoration, and required monitoring if the Board approves the Project.

ID	Issue Text	Response Text
I-007-Conaway-1	I do not approve spending $4 million to ruin our lake and provide dubious path for spawning steelhead. Keep in mind that there's a small vocal minority of people that favor fish over people. The salient majority are really going to be pissed if you approve this project.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Your opposition to the Project is part of the public record.

ID	Issue Text	Response Text
I-008-Copeland-1	As a long time resident of Almaden Valley I was dismayed to read about the proposed plan to refill part of Almaden Lake for reasons that I feel are not justified. The Almaden Lake park is the one of the nicest ones we have in Santa Clara Valley, and in my opinion the refill proposal if realized would be a great disservice to the citizens of Almaden and the entire area.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Your opposition to the Project is part of the public record.
I-008-Copeland-2	You must know how congested and over-crowded this valley is now with very little open space recreation areas left. Why would you want to take away or degrade one of the few places we have remaining to relax and enjoy a natural setting?	As discussed in EIR Section 3.N, Recreation, the closure of some of the recreational amenities at the park would be temporary (approximately 30 days, but subject to construction schedule), and visitors would continue to have access to many of the other amenities. As discussed in Impact 3.N-1, the Project would result in several permanent operational improvements to the Park. The levee would be utilized as both a road for District and Park maintenance vehicles, and as a pedestrian pathway. This pathway would connect with the existing Guadalupe River Trail beyond the north end of the lake and with the existing Los Alamitos Creek Trail at the south end of the lake. The existing boat launch ramp and boat house would be relocated to the southeastern area of the reconfigured lake. Pedal boating would continue at the Park operating out of the boat house. The open park area along the western shore of the lake would be expanded. The open park area expansion would convert the sandy beach to an open grassy area, changing the recreational use of this area. These long-term improvements to the Park would not result in an increase in the use of existing neighborhood and regional parks or recreational facilities, as the temporarily displaced uses would return to this Park. Therefore, this impact would be less than significant.
I-008-Copeland-3	Please put me down for a NO vote on this project.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Your opposition to the Project is part of the public record.

ID	Issue Text	Response Text
I-009-Daniels-1	1) New channel of Alamitos Creek near the Boat House: City of San Jose has an existing 42" CMP storm drain outfall pipe (labeled as #435) and concrete riprap structure located nearby-draining into the current, existing lake. Q: will the Project affect this City asset? If yes – what will be done to structure which is collapsing around the CMP	As described on EIR page 2-42, excavation activities for the Project include re-contouring the bed of Almaden Lake and Alamitos Creek, preparing the levee foundation, reconfiguring/cutting the existing west bank of Almaden Lake, reconfiguring the shape of the existing island, trenching for inlet pipes south of Almaden Lake Park, and trenching for a pipeline from the lake to the Alamitos Percolation Pond/Los Capitancillos Percolation Ponds pipeline. The existing stormdrain outfalls and associated structures would be reconstructed as needed to conform to new banks of the creek and lank and incorporated into the lake reconfiguration.

ID	Issue Text	Response Text
I-010-Demroff_1-1	What will be the total cost for this project? What will be the annual cost for the imported water to maintain the lake?	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Estimated construction cost is $45 million. As water to fill the lake would be circulated to the Alamitos Percolation Pond for groundwater recharge, there would be very little water lost.

ID	Issue Text	Response Text
I-011-Demroff-1	I am concerned about the cost. The cost per trout is thousands of dollars per fish. The lake will need 50 gallons per second. That will be more than all the residents of Almaden Valley for the day. The Methyl Mercury is decreasing without this major project.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Economic issues are not discussed in the EIR, consistent with state law. Water to fill the lake would be circulated to the Alamitos Percolation Pond for groundwater recharge. The Project would not change the amount of water that is recharged into the groundwater basin. While methylmercury levels are decreasing without this Project, the District is developing this Project to reduce methylmercury and mercury in the lake to promote or further the goals of the state water quality objectives, but also to reduce lake entrainment of fish, and improve temperature conditions and reduce predation for native fish. Without the Project, these other Project objectives would not be met.

ID	Issue Text	Response Text
I-012-Dohmen-1	Should redesign Almaden Lake contain two fauna habitat islands or one? One, less is more.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. The preference for a single island is noted.
I-012-Dohmen-2	Should swimming capability be established in redesigned Almaden Lake by becoming a future City Parks Department project goal? No, too much work, cost, responsibility, and liability for the city.	The proposed Project does not include changes to operation of Almaden Lake Park, which is managed by the City of San José. Questions regarding park operations should be directed to the City (https://www.sanjoseca.gov/Home/Components/FacilityDirectory/FacilityDirectory/2082/2028).

ID	Issue Text	Response Text
I-013-Ferree-1	Excellent presentation the district has obviously listened to the residents over the years and the current plan looks great.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Thank you for the feedback regarding the District's outreach efforts.

ID	Issue Text	Response Text
I-014-Frommer_Boyer-1	Please address how the restoration of water flow through the Almaden Lake Park will tie into Coyote Valley Watershed's health. That will help to continue to educate the public on the BIG picture, not just their 'backyards'.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. The Project is not located in Coyote Valley or the Coyote Watershed. The Project is in the Guadalupe Watershed and would provide some improvements in the overall watershed's health by reducing the production of methylmercury and improving the migration path for native fish. However, the specific Project objectives are to reduce mercury in the lake and improve conditions for the fish in the vicinity of the project.
I-014-Frommer_Boyer-2	Please point us to reports on the chemistry aspects of the Almaden Lake Improvement Project, for example • Past, current, and future status of monitoring and treatment of the various mercury salts • Microbe or other reagent treatment of methylmercery • The nature of the material layer to be applied to the emptied lake bottom before refilling with water.	Please refer to EIR Chapter 2, Project Description, for detailed discussion on the mercury in Almaden Lake, and the role the existing conditions of the lake have in the formation methylmercury. The nature of the cap that would cover the lake bottom is also discussed in Chapter 2, Project Description. Microbe or other reagent treatment of methylmercury is not proposed under the Project.
I-014-Frommer_Boyer-3	P.s. hope you've seen "Remediation Strategies for Mercury Contaminated Lakes and Reservoirs Within the State of California" – a 2017 USF Masters thesis by Emily Chortek, on-line.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Staff reviewed the referenced report; however, please see EIR Section 4.D, Alternatives Considered but Rejected from Further Analysis. Over the course of the planning effort, the District considered numerous options for the Project in the context of the project objectives, technical feasibility, agency comment, public input, and constraints on implementation. Alternatives that address mercury only would not meet the purpose of the Project to restore Alamitos Creek's stream function within the footprint of Almaden Lake in order to improve steelhead and other anadromous fish habitat nor would they meet the specific Project objectives. As a result, mercury removal options were considered but rejected from further consideration.

ID	Issue Text	Response Text
I-015-Klaus-1	I have a concern. It would think that providing a controlled inlet from the creek and using the pump now planned to remove water from the lake would be better than getting water from another source at what expense and whose authority.	Please see EIR Section 4.D, Alternatives Considered but Rejected from Further Analysis, which includes Option 1, Alamitos Creek Water Source. This option would meet some of the project objectives, but does not reduce the significant impacts of the project and reintroduces mercury into the lake. Further, this option would require approval of a water right change petition by the State Water Resources Control Board and require regular maintenance in the creek to remove sediment around an inlet. Thus, this option does not meet the requirements for a valid alternative to the Project under CEQA.
I-015-Klaus-2	In discussing the park I see no mention of what amenities will be added/retained/removed/etc. While this may fall under another departments control I think we should know what will happen in that regard.	As discussed in EIR Chapter 2, Project Description, and in Impact 3.N-1 the Project would result would result in several permanent operational improvements to the Park. The levee would be utilized as both a road for District and Park maintenance vehicles, and as a pedestrian pathway. This pathway would connect with the existing Guadalupe River Trail beyond the north end of the lake and with the existing Los Alamitos Creek Trail at the south end of the lake. The existing boat launch ramp and boat house would be relocated to the southeastern area of the reconfigured lake. Pedal boating would continue at the Park operating out of the boat house. The open park area along the western shore of the lake would be expanded. The open park area expansion would convert the sandy beach to an open grassy area, changing the recreational use of this area. These long-term improvements to the Park would not result in an increase in the use of existing neighborhood and regional parks or recreational facilities, as the temporarily displaced uses would return to this Park. Therefore, this impact would be less than significant.

ID	Issue Text	Response Text
I-016-Koopman-1	Do we need a big wall to block Almaden Expressway so the noise level will not affect the birds.	This comment requests consideration of the need to reduce the noise level from the Almaden Expressway on the Lake. The Project purpose is to restore Alamitos Creek's function within the footprint of Almaden Lake Park in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint, and minimizing impacts to existing recreational features within the Park (EIR page 2-7). Thus, the need for a soundwall along Almaden Expressway does not reflect the Project purpose, and the Project does not include a soundwall along the Almaden Expressway. The EIR considers the environmental effects of implementing the Project as described in Chapter 2, Project Description, and does not consider the effects of existing facilities such as Almaden Expressway on Almaden Park wildlife. The Project does not introduce Park elements that are closer to Almaden Expressway than currently exist, thus, the Project would not exacerbate the existing effect of Almaden Expressway on wildlife.

ID	Issue Text	Response Text
I-017-Kuhl_1-1	1. The = 55 dB noise level is intended to apply in an urban city center and levels that exist near a freeway. In my opinion, one must be cautious in using 55 dB as an acceptable goal in Almaden Lake Park because of its natural setting. However, this is what the San Jose City code specifies and allows. 2. The City's General Plan or Code "Noise" abatement requirements are based on the average sound energy levels over a 12- hour period that is called the ambient noise level. 3. The City of San Jose's General Plan identifies a 5 dB increase in ambient noise as being significant and requires an EIR. 4. The City's noise abatement ordnance makes no recognition of sound tonal characteristic differences (i.e. an egret bird call, the rustle of leaves in the wind, the flow of water over rocks, the roar of a Harley Davidson motorcycle or the hum of a water pump). 5. The City's noise abatement code makes no recognition of more stringent goals one might seek to have so as to not degrade a natural park setting.	The City Municipal Code restricts operational noise in residential areas to 55 dB DNL (commercial and industrial areas have higher limits of 60 dB and 70 dB). As discussed in EIR Section 3.L, Noise, the City does not have quantitative criteria for assessing construction noise impacts at neighboring noise-sensitive uses. However, the City's General Plan establishes that residential uses within 500 feet of construction may be adversely affected by construction noise and limits the hours of construction. Thus, to comply with the intent of this General Plan Policy, the hours of construction are limited to 7 a.m. to 7 p.m. and development of a Construction Noise Logistics Plan has been identified as a mitigation measure that would reduce construction noise effects to less than significant (Impact 3.L-1). Regarding operational noise, the EIR applies the City's 55 dB DNL threshold to consideration of project effects. The Envision San Jose 2040 General Plan limits the operation of new development to a 5 dB increase at noise sensitive receptors. As noted in Section 3.L.4, the existing ambient sound DNL along Coleman Road is already 63 dBA, so the 55 dB DNL threshold used in the analysis is more restrictive. It is correct that the City's code does not provide a more stringent goal for a natural park setting; however, substantial operational noise effects are not anticipated under the Project as the Project does not include mechanized or other operations, with the exception of a pump station which will be a buried structure, which would dissipate pump noise below the operational noise threshold for residential uses of 55 dB DNL. Other operation period activities would be limited to the use of light-duty trucks and other small equipment or tools for ongoing maintenance activities. These activities would not cause substantial noise, and would occur intermittently.
I-017-Kuhl_1-2	6. For the proposed Guadalupe Landfill "Gas Recycling Facility," at the property line shared between the Almaden Quicksilver Park and Guadalupe Landfill's parcel, the measured ambient sound was 39:42 dB over a 24-hour period. However, the ambient noise significantly varied by time and day of the week. The ambient noise was ˜40 dB during rush commute hours in Almaden Valley and went down to ˜28 dB between midnight and 4:00 am on weekends. It surprised me how high the average noise level remained at midnight even on a Sunday. I went out to the site once at midnight to get a sense of what the low ambient noise level was like. I could very distinctly hear a Harley Motorcycle miles away going up Almaden Expressway and a jet plane flying 35,000 feet above me but I also heard the hoot of owls and the rustle of leaves in the wind in the quite periods in the hour I spent at the site. It is these quite periods we should want to preserve, if possible in the Park.	Based on refined design of the Project the pump station discussed in the Draft EIR would be constructed underground which would minimize operational noise from this facility (see discussion of Pump Station in Section 2.D.1). Following completion of Project construction, the Project would not include operations that would substantially increase noise generated within the Park, as discussed in the prior response. Further, the Project does not result in any change in land use beyond the Park itself, and would not increase traffic levels on area roadways.
I-017-Kuhl_1-3	You indicated 71 dB as the noise level on Coleman for what I assume was the average ambient noise measured over a 24-hour period. A 72 dB noise level is similar to standing next to a gas powered lawn mower continuously operating for 24 hours. This 72 dB average nose energy measurement does not define the peak or low noise levels or their duration nor the noise tonal characteristics. As a point of reference, = 57 dB was Port of Los Angeles proposed 4-lane suspension bridge "noise" level requirement in 2014. In my opinion, using this Coleman road noise as the ambient noise level reference point for the EIR has no value unless the water pump is going to be located at a location next to the road near where the ambient noise measurement was made.	Please see the response to the comment I-017-Kuhl 1-1 and I-017-Kuhl 1-2 regarding why operational noise impacts would be less than significant. Table 3.L-2 lists the measured ambient noise level along Coleman Road as 52.0 dBA at the northwest corner of Almaden Lake Village, and 55.4 dBA behind the Le Mirador Senior Apartments. A gas lawn mower operates between 90 and 100 dB.

ID	Issue Text	Response Text
I-017-Kuhl_1-4	To practically resolve the Lake water pump noise in a manner recognizing the Park's natural theme yet not creating overly burdensome and costly noise abatement goals, I recommend the following approach: 1. Identify the precise planned pump location and make ambient noise measurements prior to site preparation and pump installation. a. Try to locate the pump installation site in a noisy location within the Park, perhaps close to Coleman Road. b. Isolated low noise locations should be avoided, if possible. c. Using the Park's property lines as the location to measure and/or monitor the pump generated ambient noise makes no sense given all the trails within the Park plus people walk all over in the grassy areas. A point 50 feet away from the pump site appears to be a reasonable compromise to be used as a pseudo relevant property line.	Please see the response to comments I-017-Kuhl 1-1 and I-017-Kuhl 1-2 regarding why operational noise impacts would be less than significant. The pump is now proposed to be buried underground near Coleman Road, which would greatly insulate any sound. The noise standard the pump must meet is 55 dB DNL at residential property lines, thus that is where monitoring would occur. Given that the pump would be in a buried structure near Coleman Road, it is unlikely to disturb park visitors given the proximity of trails to Coleman Road and Almaden Expressway.
I-017-Kuhl_1-5	2. Measure the ambient noise level 24/7 at that selected site location. a. Identify the ambient noise measured by hour for each separate hour on a 24 hour clock over the 7 day period. However, different from the code requirement and recognizing the Park natural theme, show the noise measurements results on a 24 hour 7 day graph or log the information for 7 days for each hour over 24 hours in a (7x24) matrix data table. b. Be sure the 7 day period selected to make ambient noise measurements is truly "normal" (e.g. not measured when project's construction is underway or during a big Park event or during a storm). c. Design the pump facility to operate at a maximum of 5 dB over the lowest measured level at the site for the period it will be operational. If possible, the pump should only operate during existing noisy Park daytime periods excluding emergencies (e.g. flood control situation).	Please see the response to comment I-017-Kuhl 1-4 regarding the location of the pump and operational noise. The pump is now proposed to be buried underground near Coleman Road, which would minimize noise from the facility. The pump will be designed to meet the City's noise standards.
I-017-Kuhl_1-6	3. For the pump's planned operational times, after it is installed, the pump facility's external noise generation must be no more than 5 dB higher than the lowest ambient noise level measured during the same time at the site prior to pump installation as measured 50 feet away from the pump's installation site. a. The pump's enclosure can be above or below ground as long as it satisfies the noise abatement goal and blends into the surroundings around it. If the pump is installed in a Park location area not normally illuminated at night, it should not have automatic night lighting.	Please see the response to comment I-017-Kuhl 1-4 regarding the location of the pump and operational noise. The pump is now proposed to be buried underground near Coleman Road. As discussed in Impact 3A-4, the Project does not include security lighting beyond what is already present in the Park.

ID	Issue Text	Response Text
I-018-Kuhl_2-1	While highly judgmental and arguable, I have personally concluded that there should only be one habitat island, rather than two.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Your preference for a single island is noted.
I-018-Kuhl_2-2	The redesigned lake with the dedicated Los Alamitos Creek channel proposal shrinks the existing lake approximately 30% radically diminishing the existing lake's size and significantly reduces Almaden Lake's aesthetic appeal to the community. For aesthetic reasons, we need to try to make the redesigned Lake appear larger, wherever possible, not smaller.	The Project was designed to separate the creek from the lake, provide adequate area in the restored riparian channel to convey a 100-year storm event, and maintain as much of the existing lake area as possible. Impact 3A-1 addresses the potential for the project to have a substantial adverse effect on a scenic vista. The operational impact discussion is supported by several visual simulations depicting site conditions from several vantage points around the lake, both following construction and approximately 8 years following construction when revegetation plants are expected to reach maturity. As discussed, the banks and lower floodplain of the restored channel would be planted with a corridor of native riparian trees and shrubs. The upper floodplain of the restored channel would be planted with native herbs and grasses, interspersed with patches of upland trees and shrubs. The new lake shore and banks of the islands would be planted with wetland and aquatic species. In total, the Project would install up to eight acres of local, native vegetation (Figures 2-6 and 2-7 in Chapter 2, Project Description). Revegetation and restoration of the Project area would visually integrate the Park with the surrounding naturalistic setting, and enhance vista views from outside the Park, resulting in a less than significant impact during Project operation. Further, as shown on the visual simulations depicting views from the east side of the lake, along the Almaden Lake Trail, and from Coleman Road looking southwest from east of Alamitos Creek, the lake would remain prominent in views from these locations, even with the lake reduced in size.
I-018-Kuhl_2-3	Adding the second island only makes the redesigned lake look even more small in return for the indeterminant value of growing the fauna population over time through increased protected island habitat. Doubling the fauna habitat with two islands could promote doubling the waterfowl population during their layovers on an annual basis. Doubling the waterfowl population would also tend to foul the Lake's water from their droppings twice as fast. This deteriorated lake water quality would then generate the need to increase Delta water flow through the lake to cleanse it which is wasteful of scarce water resources.	Please see the prior response regarding aesthetic resources effects. The exiting island primarily supports nesting for various egret and heron species which are much smaller in number than geese and gulls at the lake which are believed to have a far greater contribution to water quality issues in the lake. Given the number of open water areas in the vicinity, including Alamitos Percolation Pond, Los Capitancilos Percolation Ponds, and other nearby operational ponds, a substantial increase in visitation of new Lake Almaden island, resulting in a doubling of the Lake population and resulting in a substantial water quality impact is unlikely.
I-018-Kuhl_2-4	The draft EIR presentation did not indicate what the project's impact will be on the north side Coleman Road relative to the lake's size.	The Project would not modify Alamitos Creek downstream of Coleman Road and that area would continue to have a wide creek channel until its confluence with the Guadalupe Creek. Under the Project, flow through the restored creek channel would depend on flows in the upstream reach of Alamitos Creek. Over time this area would likely fill with sediments that currently are trapped in the lake. The resulting channel is expected to be similar to the downstream reach to the Alamitos Drop Structure.
I-018-Kuhl_2-5	Today, Almaden Lake continues under the Coleman Bridge north, increasing the overall lake's perceived size by about 25%. After project implementation, it is my assumption that this area north of Coleman Road will be totally dry, even during the wet season due to continuation of the new Los Alamitos Creek channel to where it merges with Guadalupe Creek forming Guadalupe River.	Please see the prior response to comment I-018-Kuhl 2-2.

ID	Issue Text	Response Text
I-018-Kuhl_2-6	3. Who will restocking Alamitos Creek with native fish (e.g. Steel Heard Trout) after an extended drought? Although native fish restocking is not an "Almaden Lake Improvement Project" goal, will Los Alamitos Creek restocking take place when necessary and performed by whom?	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the. The District does not propose to restock the lake. Restocking of the creek would not be necessary. Alamitos Creek would be connected upstream and downstream allowing the natural migration and recruitment of fish through the Project area.
I-018-Kuhl_2-7	During the recent 4 year drought at its peak, I can vividly remember walking up Los Alamitos's Creek bed between Almaden Lake and Harry Road and the creek bed was bone dry except for a few stagnate puddles of water. A massive native fish fingerlings die-off must have occurred during the drought. Periodic restocking programs appear to be needed to restore native fish in the creek's ecosystem after severe droughts when water flow from reservoirs and the delta is rigorously rationed and severely constrained.	Please see the response I-018-Kuhl 2-6. Drought is a normal occurrence and native fish have evolved with dry conditions. Following the recent drought, native fish recolonized areas of Alamitos Creek that dried out.[4]
I-018-Kuhl_2-8	The water temperature levels deem as being too high thus dangerous for native fish survival or at unacceptable high levels stimulating methylmercury generation were not identified in the draft ERI presentation. Obviously, managing the water temperature requires cold water inflow and warm water outflow from Los Alamitos Creek's new channel and through the redesigned Lake down to the dam adjacent to Los Alamitos Percolation Ponds across Guadalupe River. The water temperature monitoring and water flow control management systems required to keep the creek's and lake's temperature below harmful levels was not described.	Under Project conditions the restored creek channel would convey water through the Project area and connect to downstream. Water temperatures in the creek are unlikely to change significantly through the channel reach. See response to comment O-004-SCCCC-4 for additional discussion about creek temperatures. The lake would be isolated post-Project with controlled inflows from the Almaden Valley Pipeline and outflows to the Alamitos Percolation Pond. Native fish are not expected to live in the separated lake, so they would not be impacted by warmer waters that may occur. Water temperatures in the lake are not anticipated to rise to a lethal level for warm-water fish that may reside in the lake. Please see the response to comment I-031-Watt_3-2 for additional discussion of lake temperatures. Given that the Project would not significantly impact water temperatures in the lake or in the creek, water temperature monitoring would not be necessary and thus is not proposed.
I-018-Kuhl_2-9	Given an extended drought and the need to severely ration water releases from reservoirs, the project's limitations, if any, in achieving desired temperature goals within the project's purview were not described.	Please see the response to comment I-031-Watt_3-2.
I-018-Kuhl_2-10	5. Plan to manage mercury laden sediment that collects at the front base of the Los Alamitos Drop Structure adjacent to the Los Alamitos Percolation Ponds was not described. The draft ERI presentation identified that mercury laden silt during natural storms will continue to be carried down Los Alamitos Creek and will be deposited in front of the Los Alamitos Drop Structure (i.e. dam) rather than within redesigned Almaden Lake. No process was described on how this potentially toxic sediment was going to be managed to prevent it from becoming an environmental problem in the ecosystem on an ongoing basis.	Sediment removal would continue in the downstream reach as currently occurs, under the Stream Maintenance Program (SMP). Removal of sediments containing mercury would be much easier in the channel upstream of the Alamitos Drop Structure compared to the lake, as this area is already subject to regular sediment removal activities. The SMP includes requirements and provisions for removing sediments that contain mercury such as worker protection, dust control, and proper transport and disposal of hazardous materials as required by existing laws and regulations.

[4] Santa Clara Valley Water District, 2020 Juvenile *Oncorhynchus mykiss* Rearing Monitoring in the Guadalupe River Watershed, February 2021.

ID	Issue Text	Response Text
I-019-Lang-1	This project is not an improvement. This lake is a beautiful park of our community and your plan is to destroy that. I do hope you reconsider.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Your opposition to the Project is part of the public record.

ID	Issue Text	Response Text
I-020-Miller-1	It appears from you web content that the primary goal is to protect the steelhead population, theoretically allowing them to navigate upstream more readily. However, I have lived here in Almaden for decades and know that the Alamitos Creek is very drought sensitive and has been essentially dry on many occasions over the last 20 years. Such susceptibility would inherently jeopardize any viable steelhead population.	It is acknowledged that, similar to existing conditions, the viability of steelhead populations are dependent on flow within Alamitos Creek, which begins upstream of the Project. The Project purpose is to restore Alamitos Creek's function within the footprint of Almaden Lake Park in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint, and minimizing impacts to existing recreational features within the Park. The Project does not extend to upstream reaches, and it is acknowledged that in some years, creek flow would not be adequate to support steelhead migration, similar to existing conditions.
I-020-Miller-2	The mercury levels in the lake bottom may be an issue, but hardly a negative risk factor for the local, lake/park visitor population. And there are way to reduce the mercury level if that was the primary intended goal.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project and so no response is required.
I-020-Miller-3	Additionally, the proposed design effectively cuts the park access to the lake by more than half, eliminating a very popular family and event lakeside setting. Not really in the best interest of the local citizens.	As discussed in EIR Section 3.N, Recreation, the closure of some of the recreational amenities at the park would be temporary (approximately 30 days, but subject to construction schedule), and visitors would continue to have access to many of the other amenities. As discussed in Impact 3.N-1, the Project would result in several permanent operational improvements to the Park. The levee would be utilized as both a road for District and Park maintenance vehicles, and as a pedestrian pathway. This pathway would connect with the existing Guadalupe River Trail beyond the north end of the lake and with the existing Los Alamitos Creek Trail at the south end of the lake. The existing boat launch ramp and boat house would be relocated to the southeastern area of the reconfigured lake. Pedal boating would continue at the Park operating out of the boat house. The open park area along the western shore of the lake would be expanded. The open park area expansion would convert the sandy beach to an open grassy area, changing the recreational use of this area. These long-term improvements to the Park would not result in an increase in the use of existing neighborhood and regional parks or recreational facilities, as the temporarily displaced uses would return to this Park. Therefore, this impact would be less than significant.
I-020-Miller-4	Looking at the marketing language in your website, and comparing that to what I hear from my Almaden neighbors, I wonder what portion of the local citizens (taxpayers) is actually for this change. You state that options 6 & 7 "received the most support", but fail to state how many citizens simply opposed the idea. My sense is that given the simple question "do you want us to mess with this lake or not?" the majority would favor leaving it alone.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project and so no response is required.
I-020-Miller-5	All this said, and in consideration of your time an attention, I will cut to the chase. I oppose this grandiose plan to rob the community of this cherished natural attraction.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project and so no response is required.
I-020-Miller-6	Though enrobed in the language of protecting the steelhead it smacks of empire building to me and lacks a compelling need to make these changes. My sense is that Valley Water would be better able to serve the rate-paying citizens of Almaden in particular and the South Santa Clara Valley in general by focusing your attention on fending off the next (coming) drought and valley- wide water shortage and not looking for pet projects to foist upon Almaden Valley residents.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project and so no response is required.

ID	Issue Text	Response Text
I-021-Padilla-1	Where would the water be coming from to provide the new water source to the lake?	Please see EIR Section 2.D.1, Project Components for a description of the Almaden Valley Pipeline Water Source.
I-021-Padilla-2	The water being drain, where would it go?	Please see EIR Section 2.D.1, Project Components for a description of the Outlet to Alamitos Percolation Pond/Los Capitancillos Percolation Ponds.
I-021-Padilla-3	How can the Valley Water help minimize the risk of air quality during construction besides watering the debris?	Please see EIR Impact 3.C-1, which considers construction phase air emissions. As discussed in that impact, the Project would generate substantial construction emissions that would be mitigated to less-than-significant levels through implementation of two mitigation measures: use of U.S. EPA Tier 4 nonroad engine standards and a series of air quality management district basic construction mitigation measures.
I-021-Padilla-4	Will the Valley Water send out notices about the noise? How can one be update about the project from start to finish.	The District would keep neighbors appraised of the Project including the start of construction and new Project phases. Please see Impact 3.L-1 regarding potential noise effects during Project construction and operation. As discussed, Project construction noise could be substantial and would require implementation of Mitigation Measure 3.L-1 to reduce effects to less than significant. That mitigation measure includes a requirement that provide for/require posting and notification of residences within 500 feet of the construction site of construction schedules, and designate a noise disturbance coordinator to respond to neighborhood complaints during construction. In addition, the District's Project website would continue to include updates regarding the Project schedule (https://www.valleywater.org/project-updates/almaden-lake-improvement-project).

ID	Issue Text	Response Text
I-022-Pagan-1	What is the plan to maintain two annual community events at Almaden Lake Park i.e. art & wine festival in September and July 4th fireworks event? Will these be maintained?	The proposed Project does not include changes to operation of Almaden Lake Park, which is managed by the City of San José. Questions regarding park operations should be directed to the City (https://www.sanjoseca.gov/Home/Components/FacilityDirectory/FacilityDirectory/2082/2028). The District has had discussions with the City on how to coordinate public events with construction activities.

ID	Issue Text	Response Text
I-023-Roldan-1	I heartily support the Improvement Project as proposed. It will be both environmentally and ecosystemically sound.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Your support of the Project is part of the public record.
I-023-Roldan-2	It will also add to the beauty of the surrounding areas… an addition we can use to help decrease the industrialize appearance of the area.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Your support of the Project is part of the public record.
I-023-Roldan-3	My one concern, however, is the imported water source that will be used. Where will it come from? Will it come from an area needs it.another lake or pond… where it is need for agricultural?	As discussed in Section 2.D.1, Project Components, the water to be imported to Almaden Lake as part of the Project would be imported from the Almaden Valley Pipeline. Please refer to Section 2.D.1, Project Components, for a detailed discussion about the Almaden Lake Pipeline. The water would be circulated to the Alamitos Percolation Pond for groundwater recharge, which is a common use of the District's imported water.

ID	Issue Text	Response Text
I-024-Romero_1-1	I was wondering if there will be a charge in the fishing rules once the construction is over with.	The proposed Project does not include changes to operation of Almaden Lake Park, which is managed by the City of San José. Questions regarding park operations should be directed to the City (https://www.sanjoseca.gov/Home/Components/FacilityDirectory/FacilityDirectory/2082/2028).
I-024-Romero_1-2	I was also wondering if any new fish will be planted in the lake after construction.	Please see the prior response.

ID	Issue Text	Response Text
I-025-Romero_2-1	How will this project effect fishing in both the creek and lake itself?	The proposed Project does not include changes to operation of Almaden Lake Park, which is managed by the City of San José. Questions regarding park operations should be directed to the City (https://www.sanjoseca.gov/Home/Components/FacilityDirectory/FacilityDirectory/2082/2028).
I-025-Romero_2-2	Also will floatubes and kayaks be allowed to fish once water is cleaner?	Please see the prior response.

ID	Issue Text	Response Text
I-026-Smith-1	As a resident that is 5 minutes from the lake, I am strongly in favor in restoring the lake water to be usable for children to wade in as it once was during my youth.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Your support for the Project is part of the public record.
I-026-Smith-2	I also strongly support creating a levee to help the animal populations thrive in the creeks.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. Your support for the Project is part of the public record.

ID	Issue Text	Response Text
I-027-Tran-1	My strong preference is that the lake size is not reduced. Are there alternatives that would route the creek around it without reducing the lake size?	As Discussed in EIR Chapter 4, *Alternatives*, the approach to alternatives selection for the EIR focused on identifying alternatives that could meet most of the basic objectives of the project while reducing one or more of its significant impacts, foster informed decision-making and public participation, and could be feasibly implemented. As shown on EIR Figure 2-1, the lake is central within the park, and an option that includes creation of a new creek alignment beyond the extent of the lake would require that the creek replace all park access and recreation facilities located to the west of the park. At least a portion of the lake would need to be removed to create the connection between the restored creek and the upstream and downstream reaches of Alamitos Creek. Further, in order to meet the project objectives to reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives, the lake would need to be drained, mercury laden sediment removed, and a cap placed on the lake bottom. Thus, it is unlikely that such an alternative would reduce or avoid any of the construction-related significant impacts of the Project. Further, such an alternative would result in permanent loss of existing recreation facilities to the west of the lake. Thus, such an alternative would not meet the requirements for a valid CEQA alternative.
I-027-Tran-2	It's so beautiful and seems a shame to lose it, though I understand the problems concerning the migrating fish and lake pollution.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. The lake would be reduced in size, but not eliminated.
I-027-Tran-3	If you must reduce it, please leave trails around the park (with a bridge over the creek) that equal approximately a 2 mile walk/bike ride. The city completed the foot bridge so that people could walk/bike around the lake and I would like to see that still possible.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project. The Project would retain all existing trails around the Park, and would include an additional trail alignment through the middle of the Park on the restored creek levee.

ID	Issue Text	Response Text
I-028-Troyan-1	I live across the street and we have a pond system. Should we expect all the lake birds to relocate to our premises? Where will they go? How can the problem of the geese just be transferred?	During project construction, the lake would be drained but the upland areas around the lake would be available to avian species. However, it is reasonable to assume that avian species may relocate to other nearby areas during construction. Given the number of large, open water areas in the vicinity, including Alamitos Percolation Pond, Los Capitancillos Percolation Ponds, and other nearby operational ponds, a substantial increase in visitation at personal / residential ponds and backyards, resulting in substantial water quality effects, would not be anticipated.
I-028-Troyan-2	Living across the street, the pump noise situation concerns me (insomniac) – Can the pumps not run at night?	Please see Impact 3.L-1, which indicates that the pump station would be housed within a deeply buried structure, with the electrical housing above grade, which would dissipate pump noise below the operational noise threshold for residential uses of 55 dB DNL threshold. Operations of moving water in and/or out of the lake would be done continuously over periods of days or weeks meaning the pumps could run at night. The 55 dB DNL (Day-Night Noise Level) accounts for noises at night being more disruptive. Noise impacts from use of the pump station would be less than significant.

ID	Issue Text	Response Text
I-029-Watt_1-1	Thank you. Have you considered removing the mercury using something like the Chalmer's device described here?	The link provided by the commenter appears broken/changed. Please see EIR Section 4.D, Alternatives Considered but Rejected from Further Analysis. As noted, the planning process for the Almaden Lake Improvement Project began in 2011. Over the course of the planning effort, the District considered numerous options for the Project in the context of the project objectives, technical feasibility, agency comment, public input, and constraints on implementation. The options included a technology-only option (increased use of solar bees) to address the lake's water quality issues. As discussed, the technology only option would not meet the purpose of the Project to restore Alamitos Creek's stream function within the footprint of Almaden Lake in order to improve steelhead and other anadromous fish habitat. This option would not separate the creek from the lake, remove potential lake entrainment of anadromous fish, nor would it reduce release of Almaden Lake's warm water downstream into the Guadalupe River. This option also would not reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives. As a result, this option was considered but rejected from further consideration. While the link to the device mentioned by the commenter is unavailable, and could not be identified through research, it would be expected that, similar to the technology only option considered, not meet the objectives of the Project.
I-029-Watt_1-2	Seems like the key issue is HG not fishing. Wouldn't a 1a option, capping the lake, more bees, and ultimately removing some of the mercury be an alternative that should at least be considered?	Please see EIR Section 4.B.4, Selected CEQA Alternatives, which includes Alternative 3, a restored creek with the lake capped and turned into open space. Alternative 3 would require approximately 100,000 cubic yards more fill material than the Project, which would require a longer construction period than the Project, and construction-related impacts would be proportionately increased. The extended construction period under this alternative would result in increased construction-related impacts to aesthetic resources, air quality, biological resources, energy resources, hydrology and water quality, and noise-related impacts. Alternative 3 would increase the construction-related impacts of the Project, and would only partially meet project objectives. In addition, Alternative 3 would require a lengthier planning period than the Project, in order to meet the regulatory and permitting requirements associated with filling Almaden Lake. Please see the prior response regarding increase use of solar bees.

ID	Issue Text	Response Text
I-030-Watt_2-1	We were especially interested in reading the EIS report because I knew as a mechanical engineer that any environmental review would have to at least consider alternatives that would have less impact on the environment. We were upset the report didn't include any alternatives to creek separation.	As discussed on EIR Page 7-1, the CEQA Guidelines, Section 15126.6(a), state that an Environmental Impact Report (EIR) must describe and evaluate a reasonable range of alternatives to the Project that would feasibly attain most of the Project's basic objectives and would avoid or substantially lessen any identified significant adverse environmental effects of the Project. An option that does not include creek separation would not meet several of the Project objectives, which include separation of Alamitos Creek from Almaden Lake, removal of potential lake entrainment of anadromous fish, and improvement temperature conditions and reduce predation for native fish. Thus, an option that does not include creek separation would not meet the requirements for a valid CEQA alternative.
I-030-Watt_2-2	Their "tools" are concrete and earth moving equipment so I am not surprised that one solution they would consider would be a big civil engineering project.	This comment does not raise a concern that relates to physical impacts of the Project or to any environmental issue related to the Project.
I-030-Watt_2-3	What I didn't expect is that they would not look seriously at any alternatives--even after the very small scale "bees" were very successful in reducing the methyl mercury in the lake.	Please see EIR Section 4.D, Alternatives Considered but Rejected from Further Analysis. As noted, the planning process for the Almaden Lake Improvement Project began in 2011. Over the course of the planning effort, the District considered numerous options for the Project in the context of the project objectives, technical feasibility, agency comment, public input, and constraints on implementation. The options included a technology-only option (increased use of solar bees) to address the lake's water quality issues. As discussed, the technology only option would not meet the purpose of the Project to restore Alamitos Creek's stream function within the footprint of Almaden Lake in order to improve steelhead and other anadromous fish habitat. This option would not separate the creek from the lake, remove potential lake entrainment of anadromous fish, nor would it reduce release of Almaden Lake's warm water downstream into the Guadalupe River. This option also would not reduce production of methylmercury, and mercury in target fish in Almaden Lake to meet applicable water quality objectives. As a result, this option was considered but rejected from further consideration.
I-030-Watt_2-4	I realize a lot of money has already been spent on this project. But failing to speak up when you know something is wrong leads to bad outcomes. Please reconsider the massive construction project proposed by the District. We likely have better solutions available at much lower cost to the environment.	Please see the responses to the comments above.

NOTE: Attachments to the Jeff Watt Comment Letter (included as Attachment G-2 of this Appendix) were reviewed in providing responses to these comments.

ID	Issue Text	Response Text
I-031-Watt_3-1	Consider Impact of global warming on the revised lake/creek specifically flood and drought. Anticipate that greater than 100 year frequency floods will occur. A planned discharge (spillway) point might make sense. Anticipate that droughts will require reduction of some or all of the supply water to the revised lake. Due low depth and less water the water level will drop much faster than in the current lake. The creek will also be dry for longer periods. Aesthetics of the creek and lake walls and bottom should consider this.	As discussed in EIR Impact 3.P-1, it is acknowledged in the EIR Project Description that there could be times when the District would not be able to provide Almaden Valley Pipeline water to Almaden Lake, including due to drought conditions, insufficient imported water supply, periodic system maintenance, or higher pressing water supply needs elsewhere in Santa Clara County. In these circumstances water would not be provided to Almaden Lake, and the District could also temporarily suspend pumping lake water to Alamitos Percolation Pond/Los Capitancillos Percolation Ponds. Should availability of Almaden Valley Pipeline water be temporarily suspended, the District would expect Almaden Lake water levels to remain relatively stable due to the underlying soil properties of the lake bed. The existing soils remaining in the lake bed after quarry operations ceased have low permeability properties, and would not be conducive to lake water percolation into groundwater. In addition, the Project would cap the lake bed with an impermeable clay layer about 2.5 feet thick, further reducing the ability of lake water to percolate into groundwater. As a result, lake water levels would remain generally stable during periods when Almaden Valley Pipeline water would not be supplied (and outlet pumping from the lake to the percolation Ponds would be similarly suspended), with lake water losses generally being limited to evaporation. Note that the level of the lake did not drop substantially during the recent drought when there were no inflows to the lake. A 100-year flood is the standard event considered by FEMA and San Jose Policy (see Section 3.K – Regional and Local Regulations). The creek upstream and downstream were both constructed to the 100-year standard. The proposed project is designed to convey the 100-year event (8,250 cfs) through the project site. The proposed levees include freeboard such that a larger event could also be conveyed downstream.
I-031-Watt_3-2	At some level the new lake may become too warm for any fish so dealing with their clean-up and disposal should also be considered	As discussed in EIR Section 3.E.1, Environmental Setting, under existing conditions, water flowing from Almaden Lake into the Guadalupe River is primarily surface water, warmer than lake bottom temperatures. And as shown on Figure 3.E-1, water temperature entering the lake is cooler than water exiting the lake, in part due retention time within the lake. Under the Project, the lake depth would be reduced, but with a smaller lake size and depth, the flow of imported water entering the lake and then pumped at the north end of the lake into the percolation ponds would increase turnover of lake water compared to existing conditions. Thus, lake temperatures are unlikely to increase under the Project, resulting in fish kills that create hazardous conditions or water quality effects.

ID	Issue Text	Response Text
I-032-Watt_4-1	In Situ Capping Lake Almaden was used as a specific example where in situ capping (adding gravel or other material without draining the lake) is recommended in the publication "Remediation Strategies for Mercury Contaminated Lakes and Reservoirs Within the State of California". In situ capping of sediments in lieu of excavation and removal will: • Significantly speed up the project timeline (one year allocation for current method); • Reduce the dust and noise impact to surrounding neighborhoods during construction; • Eliminate the need to remove, transport, and dispose the toxic bottom sediments; • Prevent potential project delays and costs due to unknown lake bottom contaminates; • Eliminate the need to kill/relocate the existing fish and waterfowl populations.	Please see EIR Section 4.D, Alternatives Considered but Rejected from Further Analysis. As noted, the planning process for the Almaden Lake Improvement Project began in 2011. Over the course of the planning effort, the District considered numerous options for the Project in the context of the project objectives, technical feasibility, agency comment, public input, and constraints on implementation. An alternative that only addresses the mercury issue would not meet the purpose of the Project to restore Alamitos Creek's stream function within the footprint of Almaden Lake in order to improve steelhead and other anadromous fish habitat. In-situ capping would not separate the creek from the lake, remove potential lake entrainment of anadromous fish, nor would it reduce release of Almaden Lake's warm water downstream into the Guadalupe River. This option also would not reduce production of methylmercury, and mercury in target fish in Almaden Lake to support applicable water quality objectives. As a result, this option was considered but rejected from further consideration. The suggestion identified in this comment, use of gravel and other materials to cap the lake without draining the lake would not meet the objectives of the Project.
I-032-Watt_4-2	Creek Diversion To achieve flood control objectives VW has constructed levees, improved flood channels, and provided diversion dams like that used just upstream of Lake Almaden. The proposed creek channel is approximately 200 ft wide to allow it to fully retain a flow expected only once in 100 years. Temporary diversion and later replacement of high flows into the lake will: • Significantly reduce the width of the new creek channel and widen the lake improving the user experience and views--especially from the West; • Trap sediments in the lake to improve downstream water quality and fish habitat when the water is returned to the creek.	The commenter suggests that high creek flow events could be diverted to the reconstructed lake, reducing the width of the creek channel as proposed under the Project. The commenter does not identify a significant effect under CEQA that this option would reduce or minimize. This option would require construction of the same elements as under the Project, but rather than a wide floodplain, construction of a diversion structure and mechanisms that would switch incoming creek flows to the lake during high flow events would be required. Thus, it is unlikely that this option would reduce overall construction impacts from that of the Project and therefore, this option would not meet the requirements for a valid CEQA alternative.
I-032-Watt_4-3	Alternate Methods for Seagull Containment VW proposes constructing a second island to discourage seagulls. The publication Exclusions of Gulls from Reservoirs in Orange County California documents the use of obstructions to discourage seagull flocks from using the reservoir. Alternate barriers could be used here, for example solar powered sprinklers used in a similar manner to the water circulating bees to discourage seagulls. Views of both sides of the lake would also be improved and aeration of the lake would improve water quality.	When suggesting the use of solar powered sprinklers to discourage seagulls the commenter does not identify a significant effect under CEQA that this method would reduce or minimize. This suggestion would reduce overall construction requirements slightly, but would be replaced by permanent structures at the lake surface. It is unlikely that this option would reduce or avoid significant project impacts as the construction associated with the island is a small element of the Project, and would be replace by additional equipment needing ongoing maintenance and periodic replacement. Further, this option would not provide the additional habitat created by the new island. Therefore, this option would not meet the requirements for a valid CEQA alternative.

ID	Issue Text	Response Text
I-032-Watt_4-4	With a proposed volume of approximately one-third of the current lake a cutoff of supply will quickly impact the health of the lake. VW should document in the EIR their prioritization plan to keep the lake healthy during a drought when supplies are limited.	As discussed in EIR Impact 3.P-1, there could be times when the District would not be able to provide Almaden Valley Pipeline water to Almaden Lake, including due to drought conditions, insufficient imported water supply, periodic system maintenance, or higher pressing water supply needs elsewhere in Santa Clara County. In these circumstances water would not be provided to Almaden Lake, and the District could also temporarily suspend pumping lake water to Alamitos Percolation Pond/Los Capitancillos Percolation Ponds. Should availability of Almaden Valley Pipeline water be temporarily suspended, the District would expect Almaden Lake water levels to remain relatively stable due to the underlying soil properties of the lake bed. The existing soils remaining in the lake bed after quarry operations ceased have low permeability properties, and would not be conducive to lake water percolation into groundwater. In addition, the Project would cap the lake bed with an impermeable clay layer about 2.5 feet thick, further reducing the ability of lake water to percolate into groundwater. As a result, lake water levels would remain generally stable during periods when Almaden Valley Pipeline water would not be supplied (and outlet pumping from the lake to the percolation Ponds would be similarly suspended), with lake water losses generally being limited to evaporation. However, should water quality in the lake begin to decline, the Project includes a pump that would allow the District to discharge lake water into the creek.
I-032-Watt_4-5	Managing Geese with the Lake Changes and in Adjacent Neighborhoods Prior to Construction A plan for managing the existing resident geese population should be developed to minimize the impact of geese intrusion on surrounding neighbors. The lake shore should include rocks and appropriate plantings to discourage geese from using the lake as outlined in DNR: Solutions to Problem Geese.	The commenter suggests that the Project should include rocks and plantings that discourage use of the lake by geese. The commenter does not identify a significant effect of the Project under CEQA that this option would reduce or minimize. While the suggestion does not appear to address a significant effect of the Project, the final lake and landscaping design has not been finalized and could consider such treatments, with input by the City of San José. However, it is noted that the park would continue to include open lawn areas and a lake, and would likely continue to include an active geese population

ID	Issue Text	Response Text
I-033-White-1	Currently one can walk from the west side of the lake to the East side along a path that crosses the (existing) bridge at the south end of the lake. In the new plan, after the levee is constructed, is this access from West side to East side, across the bridge still available?	Under the Project the bridge over Alamitos Creek upstream of the project, and the bridge over the creek to downstream of the project (and north of Coleman Road would be retained. Further, as discussed on EIR page 2-25, the Project would create a new trail/walking path along the proposed levee that would connect to the existing trail system.

Attachment G-1:

Santa Clara County Creeks Coalition Attachments to Comment Letter Dated December 22, 2019

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Simulated Water Temperature Effects of Bypassing Almaden Lake

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Jones & Stokes. 2004. *Simulated water temperature effects of bypassing Almaden Lake.* July. (J&S 02-357.) Sacramento, CA.

Contents

Page

Simulated Water Temperature Effects of Bypassing Almaden Lake 1
Introduction 1
Recalibration of Simulated Temperatures at the Alamitos Drop Structure 2
Old Results of Model Calibration 3
Parameter Modifications 4
New Model Calibration Results 6
Simulated Temperature Effects of Almaden Lake Bypasses 8
Modeling Assumptions 8
Bypass Scenarios and Their Assumptions 10
Results 11
Additional Considerations 14
Conclusions 14
References Cited 17
Printed References 17
Personal Communications 17

Tables

Page

1 Flow Conditions for Dry/Median Year 18

2 Shade and Channel Geometry Parameter Values for Existing and Altered Channels..... 19

3 Assumptions for the Scenarios to Simulate the Temperature Effects of an Almaden Lake Bypass 20

4 Simulated Reduction in Average and Average Maximum Water Temperatures in Lower Guadalupe Creek (Segment 6) and in the Guadalupe River upstream of the Alamitos Drop Structure (Segment 18) Resulting from the Full Growth of Mitigation Plantings along Lower Guadalupe Creek 21

5. Change in Average Monthly Temperature in Model Segments 17, 18, and 23 Associated with the Creation of a Short and Long Almaden Lake Bypass 22

6 Change in Average Maximum Temperatures in Model Segments 17, 18, and 23 Associated with the Creation of a Short and Long Almaden Lake Bypass 23

Figures

Follows Page

1 Confluence of Guadalupe Creek, Alamitos Creek, and Guadalupe River with the Assumed Alignment for the Almaden Lake Bypass 23

2 JSATEMP Model Segments and Stream Flow Gages in the Guadalupe River Watershed 23

3 Water Temperature at the Alamitos Drop Structure during 1996, Comparison of Measured Temperatures to Old and New Simulated Temperatures 23

4 Water Temperature at the Alamitos Drop Structure during 1997, Comparison of Measured Temperatures to Old and New Simulated Temperatures 23

5 Water Temperature at the Alamitos Drop Structure during 2002, Comparison of Measured Temperatures to Old and New Simulated Temperatures 23

6 Water Temperature at the Alamitos Drop Structure during 2003, Comparison of Measured Temperatures to Old and New Simulated Temperatures 23

7 Water Temperature at Branham Lane during 2001, Comparison of Measured Temperatures to Old and New Simulated Temperatures 23

8 Water Temperature in Almaden Lake during 1997, Comparison of Measured Temperatures to Old and New Simulated Temperatures 23

9 Water Temperature at Branham Lane during 1996, Comparison of Measured Temperatures to Old and New Simulated Temperatures 23

10 Water Temperature at Branham Lane during 1997, Comparison of Measured Temperatures to Old and New Simulated Temperatures 23

11 August Temperatures in Guadalupe Creek through the Upper Project Area during the Dry/Median Year 23

12 April Temperatures in Guadalupe Creek through the Upper Project Area during the Dry/Median Year 23

13 Monthly Temperatures in Model Segment 6, Lower Guadalupe Creek, during the Dry/Median Year..... 23

14 Monthly Temperatures in Model Segment 17, Lake Almaden Area, during the Dry/Median Year 23

15 Monthly Temperatures in Model Segment 18, upstream of Alamitos Drop Structure, during the Dry/Median Year..... 23

16 Monthly Temperatures in Model Segment 23, near Gage 23B, during the Dry/Median Year 23

Simulated Water Temperature Effects of Bypassing Almaden Lake

Introduction

The increase in water temperature in Almaden Lake has prompted this investigation into the potential cooling effects of bypassing the lake. The purpose of this report is to present estimates of the cooling effect on the upper Guadalupe River of altering Alamitos Creek so that it bypasses Almaden Lake, rather than flowing directly into the lake as occurs under existing conditions. This report provides estimated temperature effects associated with two alternative bypasses: a short bypass and a long bypass. As part of this evaluation, the JSATEMP stream temperature model performance was evaluated and improved for the simulation of water temperature at the Alamitos Drop Structure.

Almaden Lake is located at the downstream end of Alamitos Creek and is just upstream of the confluence of Alamitos and Guadalupe Creeks (Figure 1). The lake is a large depression in the river channel that was created by the inundation of a gravel-mining pit. Water flowing out of the lake is primarily from the lake's surface. The lake is more than 40 feet deep in places, and thermal stratification allows bottom temperatures to remain 10–20ºF cooler than surface temperatures.

The elevation of the lake surface is typically raised 5 feet in the summer when flashboards are installed at the drop structure. Installation of the flashboards allows the Santa Clara Valley Water District (SCVWD) to divert water to the offstream Alamitos Percolation Pond (Figure 1). In addition, the installation of the flashboards creates a backwater area in the section of river between Coleman Road and the drop structure and changes the flow characteristics from riverlike (i.e., fairly shallow, narrow, and fast moving) to lakelike (i.e., fairly deep, wide, and slow moving). Water from Guadalupe Creek flows into this backwater area.

Measured and simulated water temperatures indicate that water temperature increases as water passes through Almaden Lake and the backwater area. This warming occurs because water from the creeks (i.e., water flowing from Alamitos Creek into Almaden Lake and water flowing from Guadalupe Creek into the backwater area) has not yet reached temperatures that are in equilibrium with meteorological conditions. The long travel time through the lake and the backwater area allows the water to reach equilibrium values. In addition, the

lake and backwater area have no shade, so the equilibrium water temperature is relatively high.

The JSATEMP stream temperature model has been used to simulate water temperatures in the Guadalupe River system for the environmental impact report/environmental impact statement for the upper Guadalupe River flood control project (upper project) (Santa Clara Valley Water District and U.S. Army Corps of Engineers 2001) and the downtown Guadalupe River flood control project (downtown project) (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2001). In addition, the model is being used as part of the mitigation and monitoring performed for the downtown project (Jones & Stokes 2004). In the model, the Guadalupe River system is divided into 39 segments and includes reaches of:

- Alamitos Creek below Almaden Reservoir,
- Arroyo Calero below Calero Reservoir,
- Guadalupe Creek below Guadalupe Reservoir, and
- Guadalupe River from Almaden Lake to Trimble Road (Figure 2).

To simulate the stratification in Almaden Lake, the lake is represented by two horizontal layers: segment 17A represents the surface layer and segment 17B represents the bottom layer. The dividing plane between the surface and bottom layers of Almaden Lake is 10 feet below the lake surface.

The model is able to simulate seasonal changes in Almaden Lake temperature because the temperatures in the two layers vary as a result of the inflow of cool water from the creeks and surface heating of the top layer. The two-layer model is able to mimic the loss of thermal stratification in the fall because, when the surface water becomes cooler than the bottom temperature, the entire lake becomes a uniform temperature.

The backwater area between the drop structure and Coleman Road is represented by segment 18.

Recalibration of Simulated Temperatures at the Alamitos Drop Structure

For the assessment of the Almaden Lake bypasses, the simulated water temperatures in the vicinity of the lake should be as accurate as possible. The JSATEMP stream temperature model was originally calibrated using water temperature data collected primarily in 1996 and 1997 (Jones & Stokes Associates 1999). Data collected from 2001–2003 are now available and have been used to improve model performance on other Guadalupe River projects.

- Recalibration was performed for Guadalupe Creek and the downtown project area using data collected in 2001, 2002, and 2003 as part of the mitigation and monitoring for the downtown project.
- Recalibration was performed for the upper project area using data measured in 2001. In 2001, however, temperatures were not measured at the drop structure; therefore, for the 2001 recalibration, no modifications were made to model parameters upstream of the drop structure.

Data collected in 2002 and 2003, which included measurements at the drop structure, were used for this project to reevaluate and improve model performance at the drop structure.

Old Results of Model Calibration

For the purposes of this report, *original simulations* are the best and most recent simulations of historical conditions, prior to beginning the recalibration of water temperatures at the drop structure, and the results of these simulations are the *old results* or *old simulated temperatures*. Old results for the drop structure are compared to temperatures measured at the drop structure (Figures 3–6) in 1996, 1997, 2002, and 2003. Because temperatures were not measured at the drop structure in 2001, temperatures from the nearest downstream measurement site, which was 1.4 miles downstream at Branham Lane, are shown instead and are compared to simulated temperatures for Branham Lane (Figure 7).

The old results for the drop structure (1996, 1997, 2002, and 2003) and Branham Lane (2001) are summarized below.

- The 1996 simulated temperatures matched the measured temperatures fairly well from February through August. Simulated temperatures in September were too low, but measured temperatures in September were incomplete.
- For 1997 and particularly 2002 and 2003, simulated temperatures were too high.
- The 2001 simulated temperatures at Branham Lane were also too high, indicating a pattern similar to 1997, 2002, and 2003, although it is possible that the 2001 model mismatch at Branham Lane could have been related to vegetation removal in Reach 12, as described in the *Summary of JSATEMP Recalibration and Results for Accelerated Locally Preferred Project* (Jones & Stokes 2003a).

The goal of model recalibration was to reduce the temperatures simulated for the drop structure for 1997 and 2001–2003 without causing detrimental effects to model performance at other locations or for the drop structure in 1996. Unfortunately, as described later, this goal was not completely attainable.

Parameter Modifications

There are multiple model parameters for the Almaden Lake area that have uncertain values. The following list describes the model assumptions that were reassessed and why parameter changes were or were not made.

- **Location of Guadalupe Creek Inflow—**In the original model simulations, the assumption was that, when the flashboards are absent, Guadalupe Creek water flows directly into the river upstream of the drop structure, and, when flashboards are installed, Guadalupe Creek water mixes with the lake water (segment 17).

  However, review of the aerial photographs (Figure 1) indicates that Guadalupe Creek water probably always enters the river at approximately the upstream end of segment 18 and does not flow into segment 17.

  In the recalibrated model, Guadalupe Creek flows are assumed to enter the upstream end of segment 18. This change caused the simulated Guadalupe Creek water to have a slight cooling effect at the drop structure. The effect is small because, when the flashboards are present, the travel time through segment 18 is long, allowing warming of the relatively cool creek water.

- **Diversion Values for Alamitos and Los Capitancillos Percolation Ponds—**In the original model simulations, diversion flows for offstream percolation were estimated using the measured flow values and model performance. In addition, for the 2001–2003 simulations, the diversions at Masson Dam on Guadalupe Creek were also estimated based on periodic flow measurements in the creek. (There are currently no stream gages downstream of Masson Dam or at the drop structure).

  These estimates were reassessed because greater diversions at Masson Dam (i.e., from Guadalupe Creek into the Los Capitancillos percolation ponds) reduce Guadalupe Creek flows. In contrast, when more water is diverted from segment 18 (i.e., from the backwater area into the Alamitos percolation pond), less water is lost from other segments, including lower Guadalupe Creek. Where flow is diverted is important because Guadalupe Creek flows cause the water at the drop structure to be cooler, whereas Alamitos Creek flows cause the water at the drop structure to be warmer. Alamitos Creek flows have a warming effect because Alamitos Creek water must pass through Almaden Lake prior to reaching the drop structure.

  In the recalibrated model, diversion values were not altered because such changes did not have a large enough effect on temperatures at the drop structure and were either detrimental to model performance for lower Guadalupe Creek or were contrary to the periodic flow measurements taken from lower Guadalupe Creek.

- **Channel Geometry for Segment 18—** In the original model simulations, **s**egment 18 was estimated to have an average depth of 6.5 feet and a width of 180 feet when flashboards are installed.

Review of the diurnal temperature variation measured at the drop structure indicates that these estimates may be suitable for the 1996 and 1997 simulations. However, a shallower and narrower channel (average of 4 feet deep and 150 feet wide) produced better model performance for diurnal variation at the drop structure for 2002 and 2003. These changes were based on aerial photographs (Shay pers. comm.) and the model calibration process.

In the recalibrated model, the shallower, narrower channel was used. This change reduced the volume of segment 18, which reduced the travel time through the segment. The reduced travel time had only a slight cooling effect on the simulated temperatures at the drop structure. The diurnal variation measured at the drop structure in 2002 and 2003 could only be matched by reducing the depth of segment 18.

- **Accretions—** In the original model simulations, it was assumed that there were no accretions in Almaden Lake or segment 18. (For the purposes of this report, accretions are local inflows that do not come from a specific tributary. They can come from seepage from offstream percolation ponds, groundwater, or small discharges to the river.)

  The effect of adding an accretion of 2 cubic feet per second (cfs) to the bottom of Almaden Lake was evaluated because the depth of the lake may allow it to intersect with groundwater. In the recalibrated model, these accretions were not added because the change had little beneficial effect on model performance.

  The effect of adding an accretion of 2 cfs to segment 18 was also evaluated. Water from the offstream percolation ponds is believed to seep back into Guadalupe Creek and the Guadalupe River at some unknown but low level. The Alamitos percolation pond is adjacent to segment 18 (Figure 1) and could be a source of accretions. The addition of a 2-cfs accretion at a temperature of 65ºF produced an improvement in model performance at the drop structure (i.e., the model matched the measurements better) for 2002 and 2003 but not for 1996. These accretions were added for the final recalibration.

- **Temperature of Accretions—**In the original model simulations, the temperature of the accretions is generally 65ºF for May–October.

  The reassessment considered varying the temperature of the segment 18 accretions from 61 to 65ºF for May–October (for November–April accretion temperatures are set to represent surface temperatures).

  This modification did not have a large effect on model performance and was not used in the recalibrated model.

- **Almaden Lake Mixing—** In the original simulations, 90% of the water leaving the lake was assumed to come from the surface layer, and the exchange flow was assumed to be zero. In the model, the user specifies the fraction of the water leaving the lake that comes from the surface and bottom layers because even though the outflow comes from the surface, some of the water may be pulled from the bottom. In addition, the user can specify a

constant exchange flow between the two layers that simulates the effect of hydrodynamic mixing processes.

Decreasing the percent of water coming from the surface from 90 to 70% produced a relatively large improvement in model performance for 2002 and 2003 but not for 1996.

In the recalibrated model, this change was used, and it represents greater top to bottom mixing in the lake, either at the outflow location or throughout the lake.

- **Size of Almaden Lake—**Old and new model results indicate that there is sometimes a slight tendency for the simulated temperatures at the drop structure to be slower than the measured temperatures in responding to the cooling meteorological conditions of the fall. If portions of Almaden Lake have more through flow than other portions, it is possible that the effective volume of the lake for water temperature purposes is smaller than the actual volume of the lake. It might take less time for lake temperature to drop in the fall if the effective lake volume is small.

  However, a reduction in lake volume in the model did not have a large effect on the rate of cooling in the fall and, therefore, was not used in the recalibrated model.

In summary, the final parameter changes made for the recalibration were:

- Guadalupe Creek flows are assumed to enter the upstream end of segment 18,
- the dimensions of segment 18 were modified from 6.5 feet deep to 4 feet deep and from 180 feet wide to 150 feet wide,
- an accretion of 2 cfs at 65ºF was added to segment 18, and
- 30% of the outflow from Almaden Lake was assumed to come from the bottom of the lake, instead of 10%.

New Model Calibration Results

For the purposes of this report, *new simulations* are simulations after the changes described above were made for recalibration of temperatures at the drop structure, the results of these simulations are the *new results* or *simulated temperatures*. The new results are shown in the bottom portions of Figures 3–7. For all years evaluated, the new simulations produced temperatures at the drop structure that were cooler and had more diurnal variation than the original simulations. This change resulted in a negative effect on model performance for 1996, did not cause much change in model performance for 1997, and improved model performance for 2001–2003.

The recalibration has the potential to affect model performance at other locations, so those results were also evaluated. The addition of the 2-cfs accretion to

segment 18 caused the calculated flow at upstream locations to be modified slightly in order to maintain the proper flow balance between upstream and downstream gage locations. As a result, temperatures upstream of the Guadalupe River had the potential to be altered by the recalibration. However, evaluation of results showed little change in model performance for segment 16, Alamitos Creek upstream of Almaden Lake (temperatures were measured in 1996 and 1997), or segment 6, the downstream end of Guadalupe Creek (measured in 1996, 1997, and 2001–2003).

Temperatures were measured in Almaden Lake in 1997 near the surface, at a depth of 5 feet, and at 15–25 feet below the surface. The variable depth of the deeper measurements was the result of entanglement of the probe line. The new simulated temperatures for Almaden Lake are slightly warmer than the old simulated temperatures, which reduces the model performance for the lake temperatures. However, because the Almaden Lake temperature probes represent temperatures at particular depths at one location in the lake, and the simulated Almaden Lake temperatures represent average temperatures for the entire surface and bottom layers of the lake, the measured temperatures can only be used as a general guideline for whether the Almaden Lake temperatures are simulated correctly. The new simulated temperatures for Almaden Lake during 1997 correctly match the measured seasonal trends (Figure 8).

Temperatures were measured at Branham Lane approximately 1.4 miles downstream of the drop structure in 1996, 1997, and 2001. The effect of the model changes on model performance at Branham Lane was similar to the effect on the performance for the drop structure: Branham Lane performance was made worse for 1996, about the same for 1997, and improved for 2001 (Figures 7, 9, and 10). In 2002 and 2003, temperatures were not measured at Branham Lane but were measured farther downstream, and the model changes had little effect on temperatures at these locations.

It is difficult to say why model performance for drop structure temperatures is different in 1996-1997 than in 2002-2003. The measured temperatures for these two sets of years are different because the 1996-1997 measured temperatures have a smaller diurnal temperature variation than the 2002-2003 temperatures (2ºF versus 5ºF during the summer). One possible explanation for the differences is that changes were made in 1999 in association with the installation of the fish ladder at the drop structure. The changes include the following.

- Prior to 1999, an open pipe connected the Alamitos percolation pond to segment 18, causing the two water bodies to maintain the same elevation. After 1999, the intake for the Alamitos percolation pond was left in segment 18, but the overflow pipe for the percolation pond emptied into the river immediately downstream of the drop structure. It is unclear how much back and forth flow occurred prior to 1999 through the open pipe, but water balance calculations performed by the SCVWD (Nam pers. comm.) indicate that there is seldom any overflow from the percolation pond to the river.
- Prior to 1999, flow was measured at the drop structure. After the installation of the fish ladder, flow could no longer be measured at the drop structure,

and model flows for segment 18 have been estimated based on historical differences between flows at the drop structure and flows at gage 23B.

- Prior to 1999, flow passed over the flashboards, whereas flow now passes through the fish ladder. However, there has been minimal change in the water surface elevation behind the flashboards (Aguilera and Bozzo pers. comm.).
- Prior to 1999, water temperature was measured on the downstream side of the drop structure. It is now measured 300–400 feet downstream of the drop structure. Based on observations and simulations, such a change is unlikely to make a significant difference in the diurnal variation of the water temperature. It is possible that there are some significant local accretions just downstream of the drop structure that could have affected the water temperature measurements, but they would not cause an increase in diurnal variation.

For the assessment of the Almaden Lake bypasses, it is more important that the model match the current conditions than past conditions. For this reason, the new simulation parameters were used for the evaluation of the Almaden Lake bypasses. The changes that were made for model recalibration were estimates of what could be producing the temperatures that were measured. If additional information becomes available, the model calibration for drop structure temperatures could be fine tuned.

Simulated Temperature Effects of Almaden Lake Bypasses

Modeling Assumptions

The purpose of the Almaden Lake bypass simulations is to estimate the cooling effect on the upper Guadalupe River of altering Alamitos Creek so that it bypasses Almaden Lake, rather than flowing directly into the lake as occurs under existing conditions. Figure 1 identifies one possible location for a bypass channel and an approximate area of soil fill placement. This alignment is conceptual in nature and has been developed so that the reviewer can more easily comprehend the proposed bypass alignment and corresponding assumptions.

Two types of bypasses were simulated: a short bypass and a long bypass.

- The short bypass would bypass Almaden Lake (segment 17) but not the backwater area (segment 18) that is created when flashboards are inserted at the drop structure, as occurs annually under existing conditions. The short bypass would affect segment 17 but not segment 18. The simulation of this bypass helps to evaluate the warming effect of Almaden Lake separately from the warming effect of the backwater area.

- The long bypass would bypass Almaden Lake and the backwater area. Alamitos Creek flows would mix with Guadalupe Creek flows in the bypass channel near the current confluence point at the upstream end of segment 18. This bypass would affect both segments 17 and 18. The existing channel in segment 18 would be modified, or a new channel would be constructed adjacent to the existing channel.

Both the short and the long bypasses would be placed in the eastern portion of Almaden Lake (Figure 1). For the temperature simulations, the location of the bypass is not important, but the length of the bypass could be important. The length of the bypass through the lake would be approximately 0.4 mile.

Simulations were run with the dry/median flows and the 1994 meteorology. These are the same conditions used to assess other upper and downtown Guadalupe River project actions.

The following modeling assumptions were made.

- The hydraulic capacity is, or will be, suitable to allow riparian vegetation to exist upstream of the drop structure (segment 18) and along the constructed bypass channel in segment 17.
- The SCVWD will divert water for offstream percolation ponds at the same rate used for the dry/median year (i.e., the same rate used for prior simulations) (Table 1). Water will be diverted from the bypass upstream of the drop structure (segment 18), even though it is possible that the SCVWD might want this water to flow into the new Almaden Lake and not through the bypass.
- No water will be diverted from Alamitos Creek or Guadalupe Creek to maintain the water elevation in Almaden Lake, and no water will be released from Almaden Lake back into the river.
- The vegetation density, distance from the channel, and growth rates for the vegetation along the bypass channel in segments 17 and 18 will be the same as those assumed for the lower Guadalupe Creek mitigation plantings (Table 2).
- The bypass channel in segments 17 and 18 will have the same channel geometry as the existing recontoured channel in lower Guadalupe Creek (Table 2).
- Riparian vegetation that has established along the edge of the low-flow channel in Reach 12 (segments 19 and 20) will remain, but there will be no additional planting. Future growth of this vegetation is not included in the simulations.
- Guadalupe Creek will continue to flow into the area upstream of the drop structure (i.e., it will not be rerouted to enter the river downstream of the drop structure).

Bypass Scenarios and Their Assumptions

Six bypass scenarios were simulated. The scenarios and their assumptions are described below.

- **Scenario 1A (No Bypass under Existing Conditions).** This scenario represents existing (baseline) conditions for the Guadalupe River and its tributaries. The scenario captures the effects of mitigation vegetation and channel grading on lower Guadalupe Creek, which was planted by the SCVWD in 2001. The scenario assumes:
  - existing (2003) vegetation and channel geometry conditions for lower Guadalupe Creek,
  - no bypass in segments 17 and 18, and
  - the same function of the flashboard system (i.e., as it has functioned historically).

- **Scenario 1B (No Bypass with Mature Vegetation along Lower Guadalupe Creek).** This scenario represents postmitigation (year 40) conditions for Guadalupe Creek and shows the predicted benefits of lower Guadalupe Creek mitigation plantings. The scenario assumes:
  - year 40 vegetation conditions in lower Guadalupe Creek are the same as those used in previous model runs, although the new vegetation growth rates were used (Jones & Stokes 2003b);
  - no bypass in segments 17 or 18; and
  - the same function of the flashboard system (i.e., as it has functioned historically).

- **Scenarios 2A (Unvegetated Short Bypass) and 2B (Unvegetated Long Bypass).** These two scenarios represent conditions immediately following bypass construction. These scenarios assume:
  - the bypass would be constructed fairly soon (i.e., before the lower Guadalupe Creek mitigation plantings become more established and provide more significant shade benefits),
  - existing (2003) conditions for lower Guadalupe Creek, and
  - the new bypasses have no vegetation cover because vegetation would consist of recently planted seedlings.

  These scenarios estimate year 1 conditions for the new bypasses.

- **Scenarios 3A (Vegetated Short Bypass) and 3B (Vegetated Long Bypass).** These two scenarios represent postmitigation (year 40) conditions for Guadalupe Creek and the bypasses. These scenarios assume the same year 40 vegetation conditions for the bypasses as those used for lower Guadalupe Creek in Scenario 1B.

The assumptions for these six scenarios are summarized in Table 3.

Results

As described below, even before vegetation becomes established along the bypass channels, the bypass channels are expected to reduce average water temperatures in the upper reaches of the upper project area (i.e., between the drop structure and stream gage 23B) during the late spring through early fall, with the long bypass being more effective than the short bypass. The cooling effects of the unvegetated bypasses on maximum temperatures, however, are small, and for some months there are temperature increases. The cooling effect of the bypass channels following full growth of vegetation is large, with average temperatures in Scenario 3B (vegetated long bypass) being up to 5.8ºF cooler than Scenario 1B (no bypass with mature vegetation along lower Guadalupe Creek).

Scenario 1A (no bypass under existing conditions) should be compared to Scenarios 2A and 2B (the unvegetated-bypass scenarios [i.e., unvegetated short bypass and unvegetated long bypass]). The comparison of Scenario 1A to Scenarios 2A and 2B is shown in Figures 11–16. This comparison shows the estimated immediate effect of creating a bypass, prior to the growth of vegetation along the bypass channels and prior to any additional growth of the vegetation along lower Guadalupe Creek.

Scenario 1B (no bypass with mature vegetation along Guadalupe Creek) represents the same conditions as Scenario 1A, except that mitigation plantings along Guadalupe Creek are fully grown. Scenario 1B should be compared to Scenarios 3A and 3B (the vegetated-bypass scenarios [i.e., vegetated short bypass and vegetated long bypass]). This comparison shows the estimated long-term effects of creating a bypass.

Longitudinal Plots for August and April

Longitudinal results are shown for Guadalupe Creek (segments 4–6) through Almaden Lake (segment 17), the area upstream of the drop structure (segment 18), and the upper project area (segments 19–29) for August and April (Figures 11 and 12). The values shown represent temperatures at the downstream end of the segments. August represents one of the hottest months, when temperature effects are likely to be relatively large. August is also a month of concern for juvenile steelhead. April represents a month of concern for out-migrating steelhead smolts. For the dry/median year, flashboards are assumed to be present for May–October, so April represents a month with no flashboards.

The simulated temperatures for August show that lower Guadalupe Creek (segments 5 and 6) is expected to be cooler once the mitigation plantings are fully grown (Figure 11 and Table 4). For August, average temperatures were 3.6ºF cooler, and the average maximum temperatures were 6.9ºF cooler with the full growth.

The segment 17 results represent the temperatures in the surface layer of Almaden Lake or the temperatures in the bypass around the lake, depending on the scenario. The August results show that, in segment 17, temperatures are highest under the no-bypass scenarios, intermediate with the unvegetated-bypass scenarios, and coolest with the vegetated-bypass scenarios. At this location, there is no difference between the short-bypass and long-bypass scenarios. Bypassing Almaden Lake has a larger effect on average temperatures than maximum temperatures because the diurnal temperature variation is much smaller in the lake than in the bypass channel because of the differences in depth.

In segment 18 in August, there is only a small cooling effect (0.5ºF) attributable to the growth of the mitigation plantings in Guadalupe Creek, which can be seen by comparing the no-bypass scenarios (1A and 1B) (Figure 11). Differences between the short and long bypasses appear in this segment. Under full-growth conditions, the long-bypass temperatures are much cooler than the short-bypass temperatures. Under unvegetated conditions, the long bypass has cooler average temperatures but warmer maximum temperatures than the short bypass. This difference between the average and maximum temperatures is caused by the large diurnal variation associated with the shallow channel of the long bypass in segment 18 compared to the relatively deep channel of the short bypass.

By the downstream end of segment 19, however, both the maximum and average temperatures for August are cooler in the unvegetated-long-bypass scenario (2B) than they are in the unvegetated-short-bypass scenario (2A). The trend for the long-bypass temperatures (both average and maximum) to be cooler than the short-bypass temperatures is carried downstream of segment 19. For August, there is a noticeable difference in temperatures between the scenarios through segment 23, which is 2.8 miles downstream of the drop structure.

Segment 24 (Reach 10B) is relatively warm because it is shallow and poorly shaded (Figures 11 and 12). Mitigation plans are being finalized for Reach 10B. It is expected that mitigation planting will occur in fall 2005. Once the mitigation becomes effective, temperatures in this reach should be reduced and, if a bypass were created, there would be better continuity of cooler temperatures.

The April temperature patterns (Figure 12) differ from the August patterns because of seasonal differences and because the flashboards were not in place in April as they were in August. In the Almaden Lake area (segment 17), the maximum temperatures in the unvegetated-bypass scenarios are warmer than the maximum temperatures in Scenario 1A (no bypass), although the average temperatures under the unvegetated bypass conditions are cooler. This difference occurs because of the small diurnal variation in Almaden Lake.

In April, the full growth of mitigation plantings in Guadalupe Creek has a relatively large cooling effect (1.4ºF) on segment 18 temperatures because the volume of segment 18 is reduced, even when there is no bypass, by the absence of flashboards. The smaller volume allows the Guadalupe Creek water to warm less as it passes through segment 18.

The bypass channel in segment 18 is shallower and has less volume than the existing channel when the flashboards are out, hence the relatively high maximum temperatures but cool average temperatures for the unvegetated-long-bypass scenario in April. The average segment 18 temperatures for the unvegetated-short-bypass are warmer in April than the no-bypass temperatures, even though they were cooler in segment 17. The explanation is that some of the cool water from the bottom of Almaden Lake contributes to the segment 18 temperatures under the no-bypass scenarios but not under the bypass scenarios. The average and average maximum temperatures in April are coolest for the vegetated bypass scenarios and remain noticeably cooler through segment 23.

Temperature Effects at Individual Segments through the Dry/Median Year

Figures 13–16 show monthly temperature patterns through the dry/median year for segments 6, 17, 18, and 23. Differences between the scenarios are shown in Tables 4–6. As a result of vegetation growth, temperatures in segment 6 are expected to be cooler by up to 4.5ºF for monthly average temperatures and 8.1ºF cooler for the monthly average of the daily maximum temperatures. This cooling in lower Guadalupe Creek is expected to reduce temperatures in segment 18 by up to 1.4ºF, with the largest cooling effect occurring in the spring, when the flashboards are not in place (Figure 13 and Table 4).

In segment 17, the vegetated-bypass temperatures (both average and average maximums) are cooler than for Scenario 1B through most of the year (Figure 14 and Tables 5 and 6). In addition, the average unvegetated-bypass temperatures are cooler than for Scenario 1A, but the diurnal variation under the unvegetated conditions is high enough to make the maximum temperatures similar to the maximums for the no-bypass scenario. Under the no-bypass scenarios, the simulated temperatures shown for segment 17 represent only surface temperatures. Fish passing through the lake could access cooler temperatures by swimming deeper.

In segment 18 (Figure 15 and Tables 5 and 6), there are large reductions in temperature under Scenario 3B (vegetated long bypass), particularly during the summer months. Compared to Scenario 1B (no bypass), the average temperatures of Scenario 3B were up to 5.8ºF cooler, and maximum temperatures were up to 5.5ºF cooler (Tables 5 and 6). Average temperatures for Scenario 3B are also significantly cooler than for Scenario 1B (i.e., multiple months with a temperature reduction of more than 3ºF). Average and average maximum temperatures for Scenario 3A (vegetated short bypass) provide a moderate temperature reduction (multiple months with a temperature reduction of more than 1ºF). The maximum temperatures for Scenario 2B (unvegetated long bypass) and the average and average maximum temperatures for Scenario 2A (unvegetated short bypass) do not offer a clear cooling benefit.

By the downstream end of segment 23, which is 2.8 miles downstream of the drop structure, the simulated temperature benefits of the bypasses is 1.1ºF or less (Figure 16 and Tables 5 and 6).

Additional Considerations

An Almaden Lake bypass could benefit fish in several ways. The temperature reductions described in this report could benefit Chinook salmon or steelhead that may pass through or reside in the upper reaches of the upper project area and Almaden Lake. The greatest temperature reductions are expected to occur in the summer, when the anadromous fish life stage most likely to occur in the Guadalupe River system is juvenile steelhead. Other potential anadromous fish benefits associated with a bypass are reduced predation and a more direct route to upstream tributaries.

There would be clear temperature benefits associated with a shaded Almaden Lake bypass. However, prior to determining whether a bypass should be constructed, project design and cost would need to be evaluated. In addition, potential use of the deep portion of the lake by anadromous fish should be assessed. Further evaluation should also include the other ecological benefits and constraints that might be associated with an Almaden Lake bypass.

Furthermore, alternatives to a bypass should be considered. One possible alternative could be cooling water in the upper portion of the Guadalupe River by increasing the amount of water being withdrawn from the bottom of Almaden Lake. Water could be pumped from the bottom of the lake through a pipe, or a temperature curtain could be installed to reduce the amount of water coming from the surface of the lake. Another possible alternative would include diverting water for offstream percolation from the surface of Almaden Lake instead of segment 18. The relocation of the diversion point could allow water levels in the area between the drop structure and the lake to be lowered, allowing segment 18 to become more riverine. A riverine channel at this location could allow vegetation to shade the water and allow the Guadalupe Creek water to stay cool for a longer distance once it enters the river.

Conclusions

Recalibration of the JSATEMP stream temperature model improved the model's ability to match the 2002 and 2003 temperatures measured at the drop structure. Recalibration had little effect on model performance for 1997 but caused a reduction in the model's ability to match the 1996 measured drop structure temperatures. A number of changes occurred in the operations and measurements at the drop structure in 1999 as a result of the installation of the fish ladder. These changes may be the cause of the apparent differences between the 1996-1997 and 2002-2003 temperatures.

The changes made to improve model ability to match the 2002-2003 temperatures at the drop structure were routing the Guadalupe Creek flow into segment 18, adding a local accretion of 2 cfs to segment 18, increasing the amount of Almaden Lake outflow coming from the bottom layer, and changing the dimensions of segment 18. Additional information could help determine whether the changes made for recalibration accurately portray the real physical conditions. Such additional information could include temperature measurements of the Almaden Lake outflow at the upstream end of segment 18, flow and temperature measurements at the old and new temperature probe locations for the drop structure, and improved water balance information for the inflows to the channel upstream of the drop structure.

The magnitude of the simulated benefits of creating a bypass depends somewhat on model inputs. The presence of local accretions can dampen the effect of warming in Almaden Lake and can dampen the effect of using a bypass. For this reason, the addition of the 2-cfs accretion to segment 18 has the effect of reducing the estimated benefit of a bypass. The local accretions are unlikely to be much more than 2 cfs because flows over the drop structure can be fairly low (average flow of 2.3 cfs for July 1996 and 3.9 cfs for July of 1997). The effect of the bypasses also depends on conditions in the bypasses. The conditions modeled here should be attainable; they represent a fairly shallow and narrow channel with good, but not complete, shade.

Temperatures from Alamitos Creek and Guadalupe Creek also play a role in the temperature effects of the bypasses. The creek temperatures have less effect when Almaden Lake is present than when there is no lake or backwater area (i.e., backwater created by the installation of flashboards at the drop structure). The simulated creek temperatures are considered to be fairly accurate because the model has been able to match temperatures at the downstream ends of Alamitos and Guadalupe Creeks.

The flows used for simulating the dry/median year represent fairly low-flow conditions at the drop structure because these flows have been altered to represent the low flows that have been going over the drop structure since 1995. Flows over the drop structure are low because the SCVWD has been diverting more water upstream of the drop structure in response to their inability to use instream percolation since 1995. Dry/median year flows at the drop structure are set at 3.5 cfs for most months. Higher flows would likely reduce the cooling effect of the bypasses but carry the cool water farther downstream before warming to no-bypass temperatures.

In the short term, before trees would have a chance to grow along the bypass channels, the creation of either one of the bypasses is unlikely to have a deleterious effect on water temperatures. The maximum effect of the bypasses is best assessed at the downstream end of segment 18, just before the water leaves the area of modification. Under the worst-case condition for the bypasses, maximum temperatures are occasionally warmer than under the no-bypass condition (by up to 2.6ºF at segment 18), but average temperatures are generally cooler (by up to 4.0ºF at segment 18).

After vegetation along the bypasses has grown, the potential benefits of the long bypass are much greater than the potential benefits of the short bypass. During the summer months, average temperatures at the downstream end of segment 18 are cooled only 1–2ºF with the short bypass but 5–6ºF with the long bypass. Summer maximum temperatures at the drop structure are cooled 1–2ºF with the short bypass but 4–6ºF with the long bypass.

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Table 1. Flow Conditions for Dry/Median Year

Month	Flow upstream of Masson Dam (cfs)	Diversions at Masson Dam (cfs)	Flow in Alamitos Creek at Gage 70 (cfs)	Diversions upstream of Alamitos Drop Structure (cfs)
January	1	0.3	0.5	0
February	3.5	0.5	6	0
March	1	0.3	1	0
April	1	0.3	1	0
May	7.1	6.1	11.1	8
June	8.2	6.2	6.5	4.5
July	5	3	6.4	4.5
August	3.4	1.4	7.4	5.5
September	1.4	0.4	4.5	1.5
October	1	0.3	2.8	0
November	1	0.3	2.5	0
December	1	0.3	1.5	0

Notes: cfs = cubic feet per second.

For the dry/median year, accretions of 1 cfs are assumed to enter lower Guadalupe Creek from the Los Capitancillos percolation ponds.

Refer to Figures 1 and 2 for the locations of features identified in the table.

Table 2. Shade and Channel Geometry Parameter Values for Existing and Altered Channels

	Existing Channel by Segment			Bypass/Postmitigation by Segment		
Parameter	6	17	18	6	17	18
Length (miles)	0.85	0.4	0.32	0.85	0.4	0.32
Trunk offset (feet) [a]	20	350	115	17	17	17
Tree height (feet)	30	15	10	58	58	58
Crown diameter (feet)	26	15	10	44	44	44
Linear vegetation fraction [b]	0.5	0.05	0.05	.7 to .8	0.75	0.75
Shade density [c]	0.87	0.8	0.8	0.87	0.87	0.87
Average depth (feet) at 1 cfs	1.1	6.4[d]	4 [e]	1.1	1.1	1.1
Width (feet) at 1 cfs	19	683.0	150 [e]	19	19	19

Notes: Segments 5 and 6 cover the length of the lower Guadalupe Creek mitigation area. Parameters for segment 5 are similar to those for segment 6 and, therefore, are not shown in this table. Model segment 17 covers the length of Almaden Lake. The lake is represented by a surface layer and a bottom layer. With a bypass, segment 17 becomes a single layer representative of a riparian channel. Segment 18 extends from Almaden Lake to the Alamitos Drop Structure.

There are separate vegetation parameters for the east and west banks. The values for both banks are similar except for the linear vegetation fractions for lower Guadalupe Creek (where a range of values is provided).

cfs = cubic feet per second.

[a] *Trunk offset* is the average distance from the center of the channel to the trees closest to the water.

[b] *Linear vegetation fraction* is the fraction of a segment that is lined with vegetation.

[c] *Shade density is the fraction* of sunlight that is blocked from reaching the water in areas that are shaded.

[d] Average depth of surface layer.

[e] The average depth and width values of 4 feet and 150 feet, respectively, for segment 18 under existing conditions are the dimensions assumed when flashboards are in place. When the flashboards are absent, the channel is shallower and narrower (2.4 feet deep and 52 feet wide at 1 cfs). For the dry/median year, the flashboards are assumed to be in place from May through October.

Table 3. Assumptions for the Scenarios to Simulate the Temperature Effects of an Almaden Lake Bypass

	Shade Parameters in Segments			Channel Geometry Parameters in Segments		
Scenarios	6	17	18	6	17	18
1A: No Bypass under Existing Conditions	E	E	E	E	E	E
1B: No Bypass with Mature Vegetation along LGC	N	E	E	E	E	E
2A: Unvegetated Short Bypass	E	0	E	E	N	E
2B: Unvegetated Long Bypass	E	0	0	E	N	N
3A: Vegetated Short Bypass	N	N	E	E	N	E
3B: Vegetated Long Bypass	N	N	N	E	N	N

Notes: Lower Guadalupe Creek has already been recontoured. Therefore the existing channel represents postmitigation conditions.

E = Existing conditions.

N = New channel geometry or full growth of new vegetation.

0 = New vegetation, provides no shade benefit following planting.

LGC = Lower Guadalupe Creek.

Table 4. Simulated Reduction in Average and Average Maximum Water Temperatures in Lower Guadalupe Creek (Segment 6) and in the Guadalupe River upstream of the Alamitos Drop Structure (Segment 18) Resulting from the Full Growth of Mitigation Plantings along Lower Guadalupe Creek

	Average by Segment		Average Maximum by Segment	
Month	6	18	6	18
January	-0.2	-0.1	-0.4	-0.1
February	-0.2	-0.1	-0.4	-0.1
March	-1.9	-0.8	-3.5	-0.8
April	-3.3	-1.4	-5.8	-1.4
May	-4.2	-0.2	-7.2	-0.2
June	-4.5	-0.4	-8.1	-0.4
July	-4.2	-0.5	-7.9	-0.5
August	-3.6	-0.5	-6.9	-0.5
September	-3.3	-0.5	-5.7	-0.4
October	-2.4	-0.3	-3.8	-0.3
November	-0.3	-0.1	-0.5	-0.1
December	-0.2	-0.1	-0.3	-0.1
Largest Drop	-4.5	-1.4	-8.1	-1.4

Table 5. Change in Average Monthly Temperature in Model Segments 17, 18, and 23 Associated with the Creation of a Short and Long Almaden Lake Bypass

	Short Bypass by Segment			Long Bypass by Segment		
Month	17	18	23	17	18	23
Unshaded Bypasses (Scenarios 2A and 2B) Compared to No-Bypass Scenario 1A						
January	-0.1	0.4	0.1	-0.1	0.3	0.1
February	-1.0	0.1	0.0	-1.0	0.0	0.0
March	-1.9	0.7	0.2	-1.9	0.0	0.1
April	-2.7	0.5	0.1	-2.7	-0.5	-0.1
May	-5.2	-0.7	-0.1	-5.2	-2.4	-0.3
June	-6.1	-0.5	-0.1	-6.1	-3.3	-0.5
July	-6.3	-0.8	-0.1	-6.3	-3.7	-0.6
August	-6.7	-1.2	-0.2	-6.7	-4.0	-0.6
September	-4.8	-0.6	-0.1	-4.8	-3.5	-0.7
October	-4.3	-0.4	-0.1	-4.3	-1.9	-0.4
November	-4.9	-2.2	-0.6	-4.9	-2.4	-0.6
December	-1.7	-0.5	-0.1	-1.7	-0.4	-0.1
Largest Drop	-6.7	-2.2	-0.6	-6.7	-4.0	-0.7
Shaded Bypasses (Scenarios 3A and 3B) Compared to No-Bypass Scenario 1B						
January	-0.5	0.3	0.1	-0.5	0.0	0.0
February	-1.2	0.0	0.0	-1.2	-0.1	-0.1
March	-4.2	0.1	0.1	-4.2	-1.9	-0.3
April	-6.5	-0.5	-0.1	-6.5	-3.6	-0.5
May	-6.2	-1.3	-0.2	-6.2	-3.7	-0.6
June	-7.9	-1.3	-0.2	-7.9	-5.6	-0.8
July	-8.1	-1.5	-0.2	-8.1	-5.8	-0.9
August	-8.3	-1.8	-0.3	-8.3	-5.8	-1.0
September	-7.2	-1.1	-0.2	-7.2	-5.6	-1.1
October	-7.4	-0.7	-0.2	-7.4	-3.7	-0.8
November	-5.1	-2.3	-0.6	-5.1	-2.7	-0.8
December	-2.0	-0.6	-0.2	-2.0	-0.7	-0.2
Largest Drop	-8.3	-2.3	-0.6	-8.3	-5.8	-1.1

Table 6. Change in Average Maximum Temperatures in Model Segments 17, 18, and 23 Associated with the Creation of a Short and Long Almaden Lake Bypass

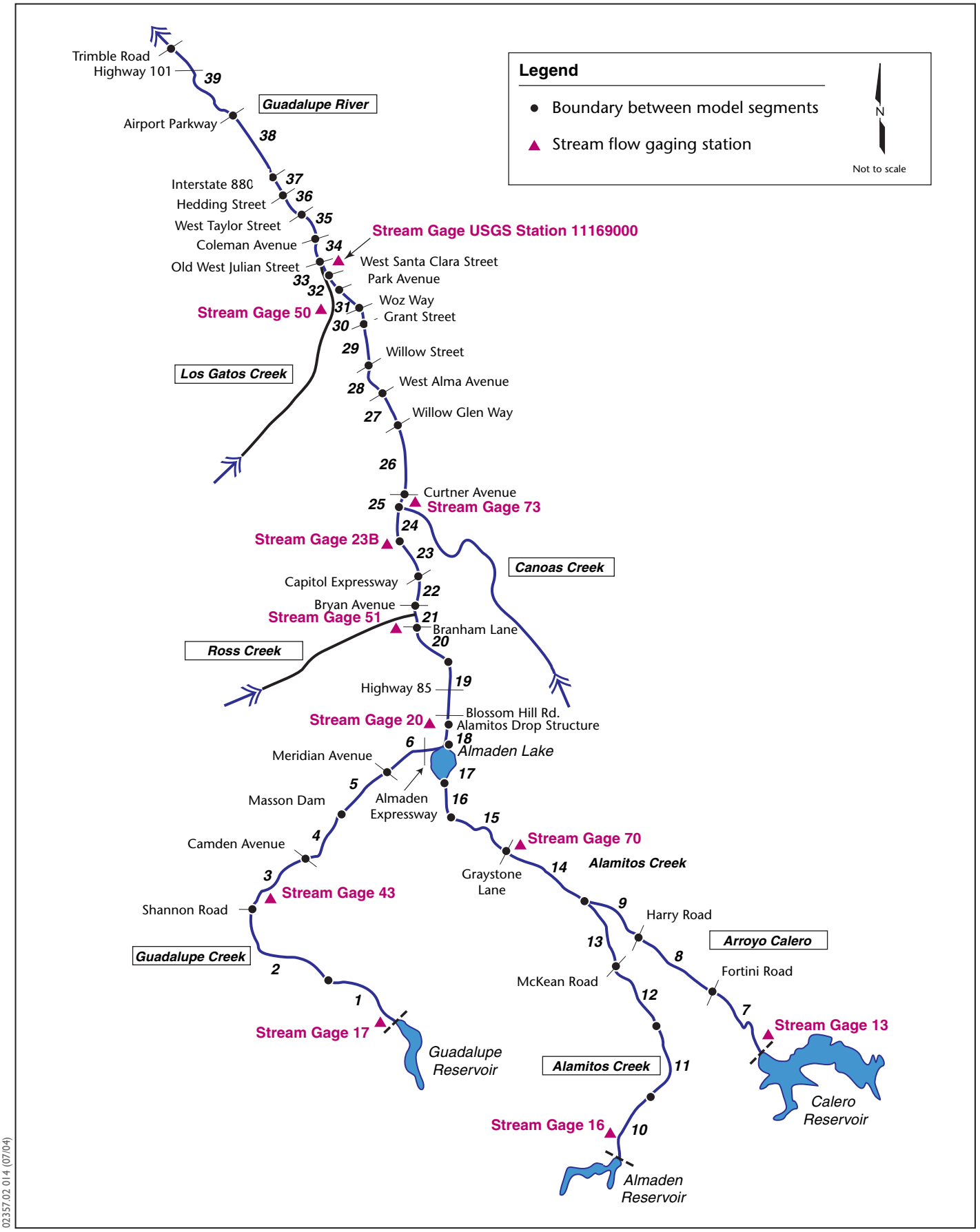
	Short Bypass by Segment			Long Bypass by Segment		
Month	17	18	23	17	18	23
Unshaded Bypasses (Scenarios 2A and 2B) Compared to No-Bypass Scenario 1A						
January	2.6	0.5	0.1	2.6	2.1	0.1
February	1.1	0.4	0.1	1.1	1.6	0.0
March	2.1	0.9	0.2	2.1	2.6	0.1
April	1.6	0.6	0.1	1.6	2.3	-0.1
May	-0.3	-0.5	-0.1	-0.3	0.9	-0.3
June	-0.7	-0.4	-0.1	-0.7	0.0	-0.5
July	-0.7	-0.7	-0.1	-0.7	-0.2	-0.6
August	-1.3	-1.1	-0.2	-1.3	-0.5	-0.6
September	0.0	-0.5	-0.1	0.0	-0.6	-0.6
October	0.0	-0.4	-0.1	0.0	0.5	-0.4
November	-2.7	-2.0	-0.6	-2.7	-0.8	-0.6
December	0.2	-0.5	-0.1	0.2	1.0	-0.1
Largest Drop	-2.7	-2.0	-0.6	-2.7	-0.8	-0.6
Shaded Bypasses (Scenarios 3A and 3B) Compared to No-Bypass Scenario 1B						
January	1.8	0.4	0.1	1.8	1.5	0.0
February	0.8	0.3	0.0	0.8	1.2	-0.1
March	-2.6	0.1	0.1	-2.6	-1.6	-0.3
April	-5.4	-0.5	-0.1	-5.4	-4.1	-0.5
May	-2.2	-1.2	-0.2	-2.2	-1.9	-0.6
June	-4.3	-1.3	-0.2	-4.3	-4.8	-0.8
July	-4.2	-1.5	-0.2	-4.2	-4.9	-0.9
August	-4.5	-1.9	-0.3	-4.5	-4.8	-0.9
September	-5.0	-1.1	-0.2	-5.0	-5.5	-1.0
October	-5.9	-0.7	-0.2	-5.9	-3.7	-0.8
November	-3.3	-2.2	-0.6	-3.3	-1.4	-0.8
December	-0.4	-0.7	-0.2	-0.4	0.4	-0.2
Largest Drop	-5.9	-2.2	-0.6	-5.9	-5.5	-1.0



02357.02 003 (07/04)

Jones & Stokes

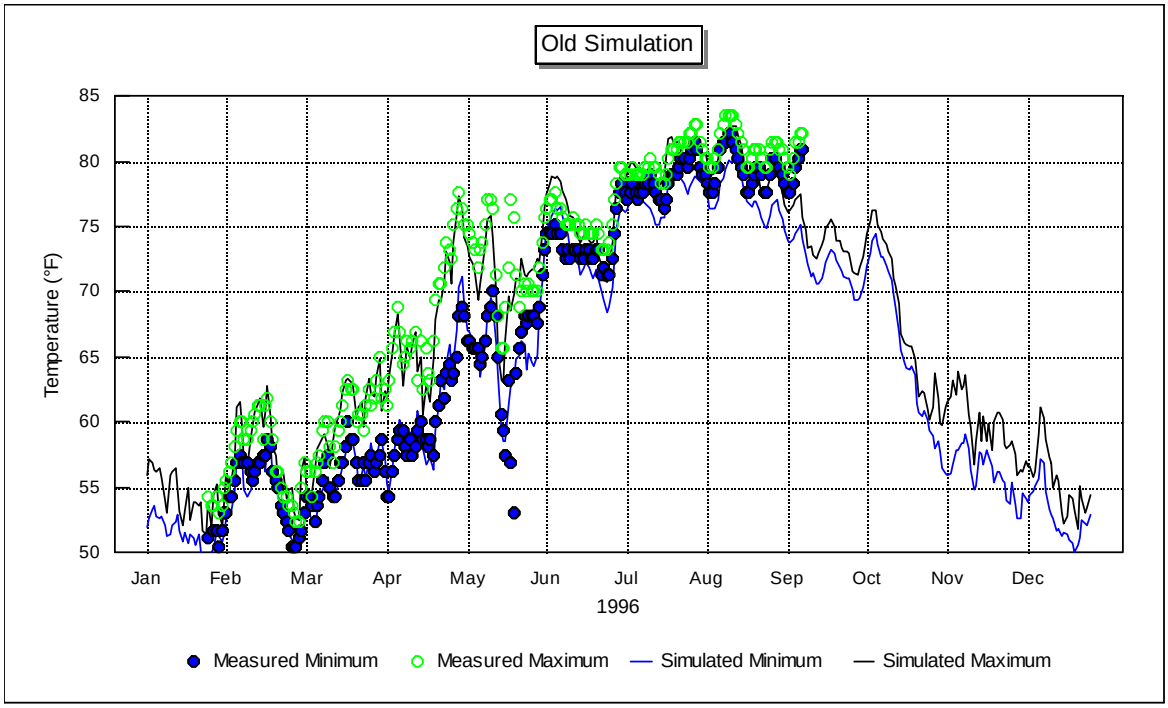
Figure 1
Confluence of Guadalupe Creek, Alamitos Creek, and Guadalupe River with the Assumed Alignment for the Almaden Lake Bypass



02357.02 014 (07/04)

Jones & Stokes

Figure 2
JSATEMP Model Segments and Stream Flow Gages in the Guadalupe River Watershed



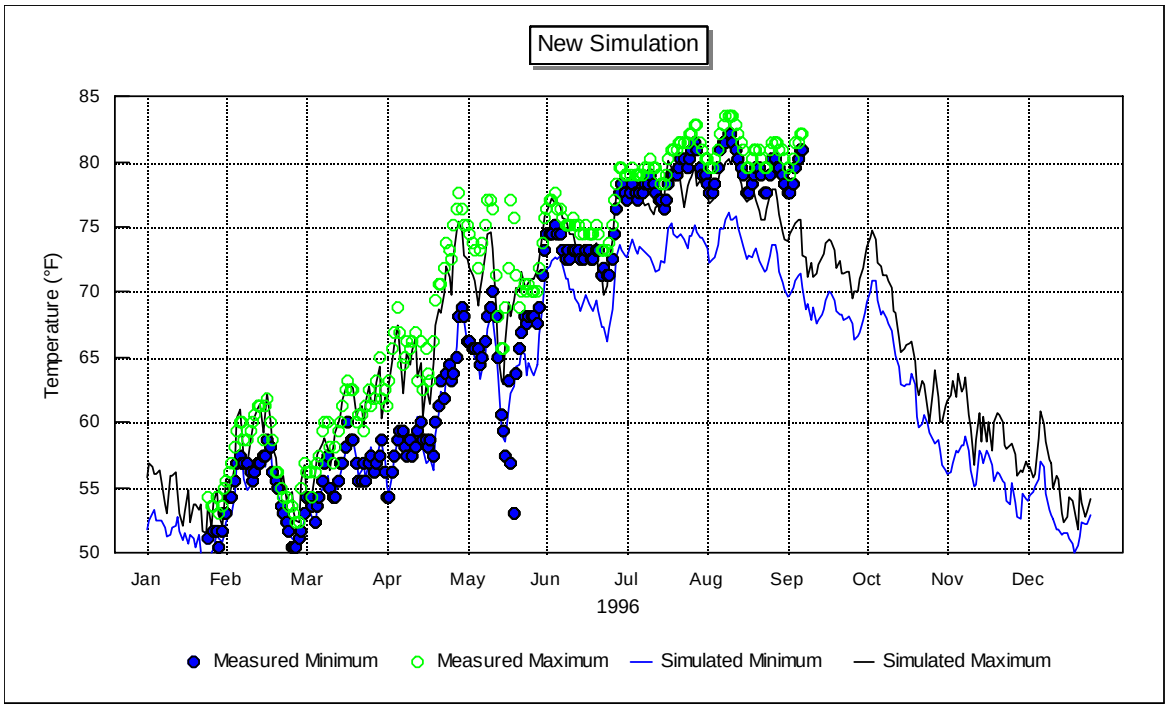


Figure 3. Water Temperature at the Alamitos Drop Structure during 1996, Comparison of Measured Temperatures to Old and New Simulated Temperatures

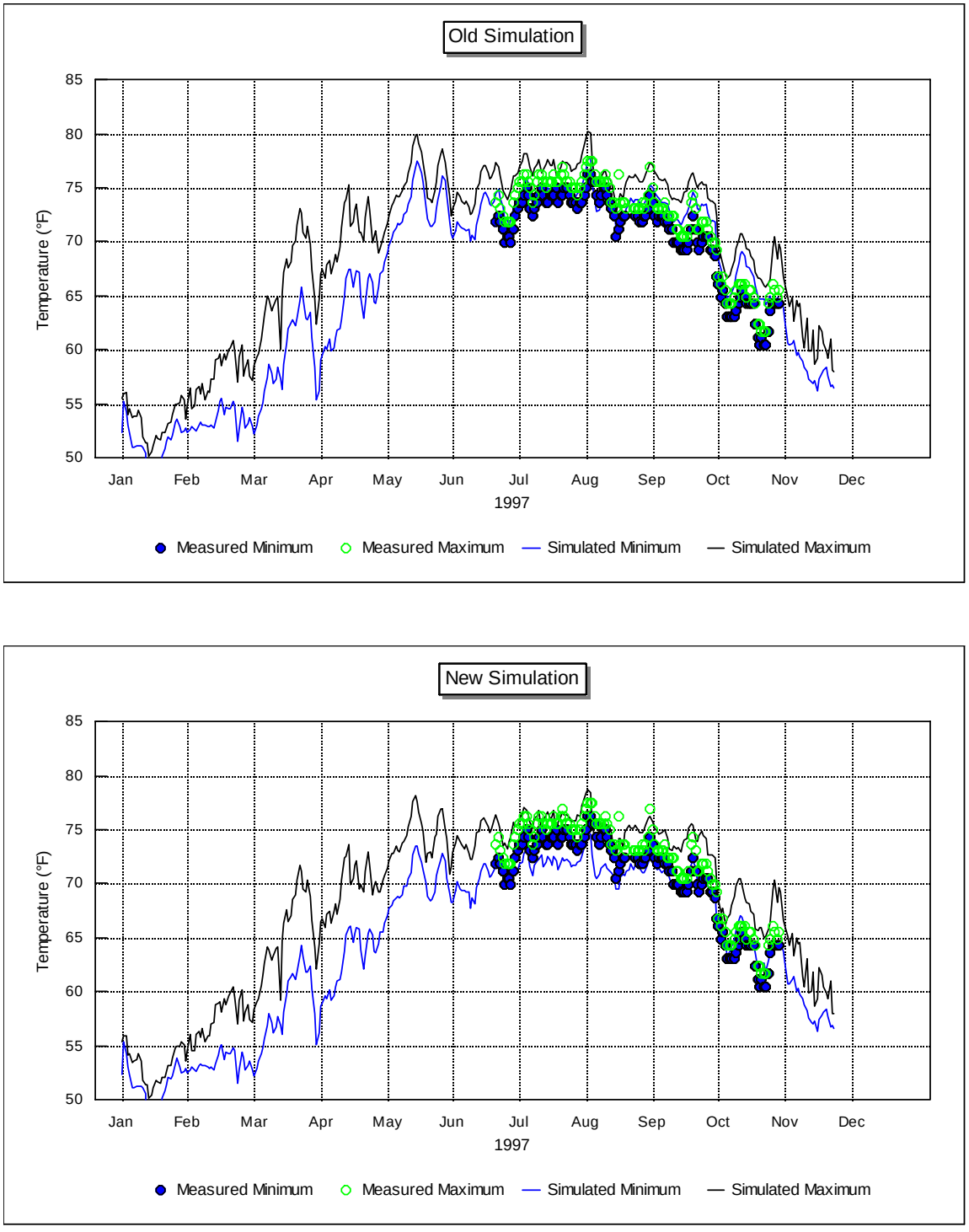
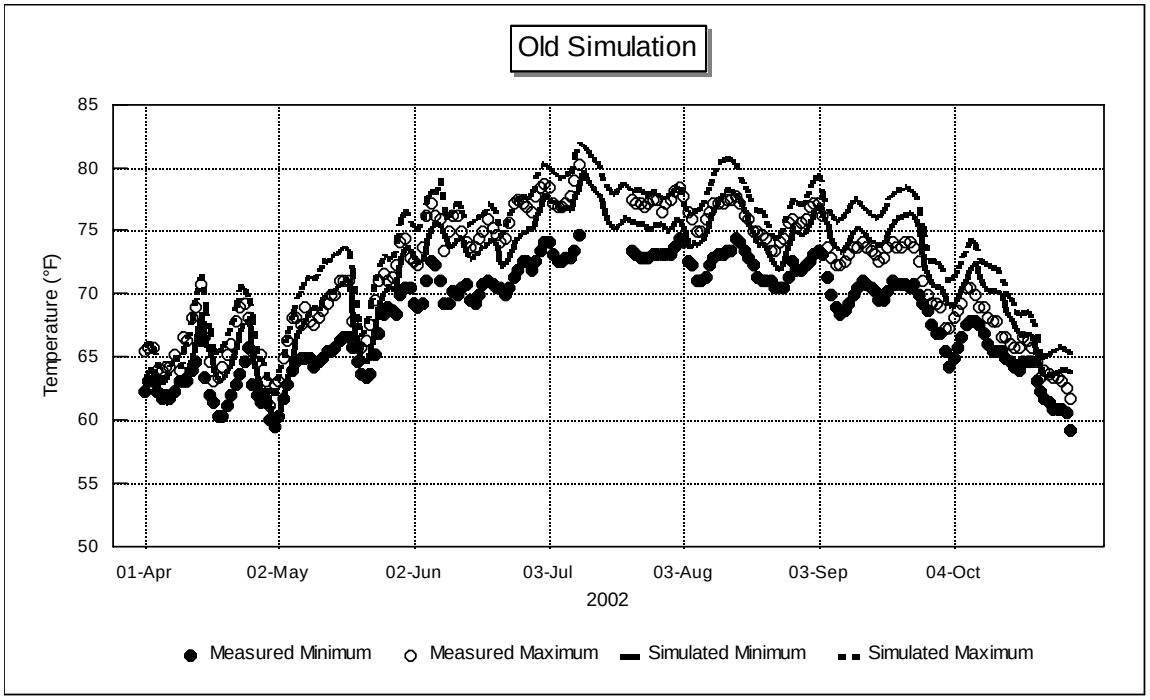


Figure 4. Water Temperature at the Alamitos Drop Structure during 1997, Comparison of Measured Temperatures to Old and New Simulated Temperatures



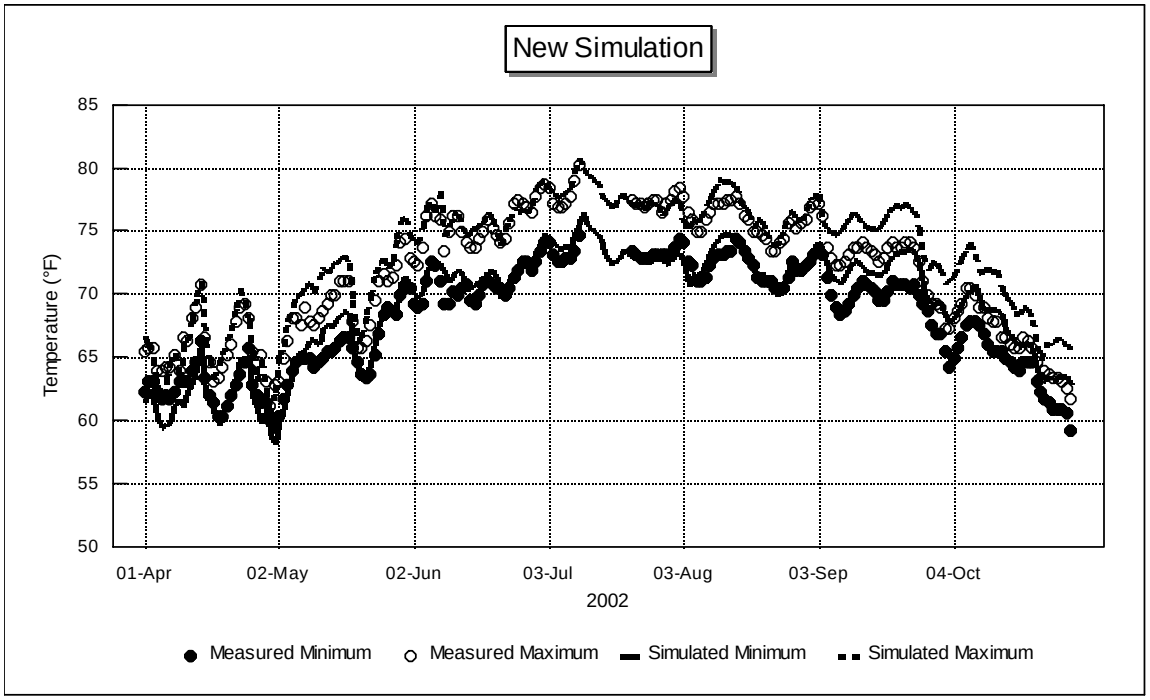
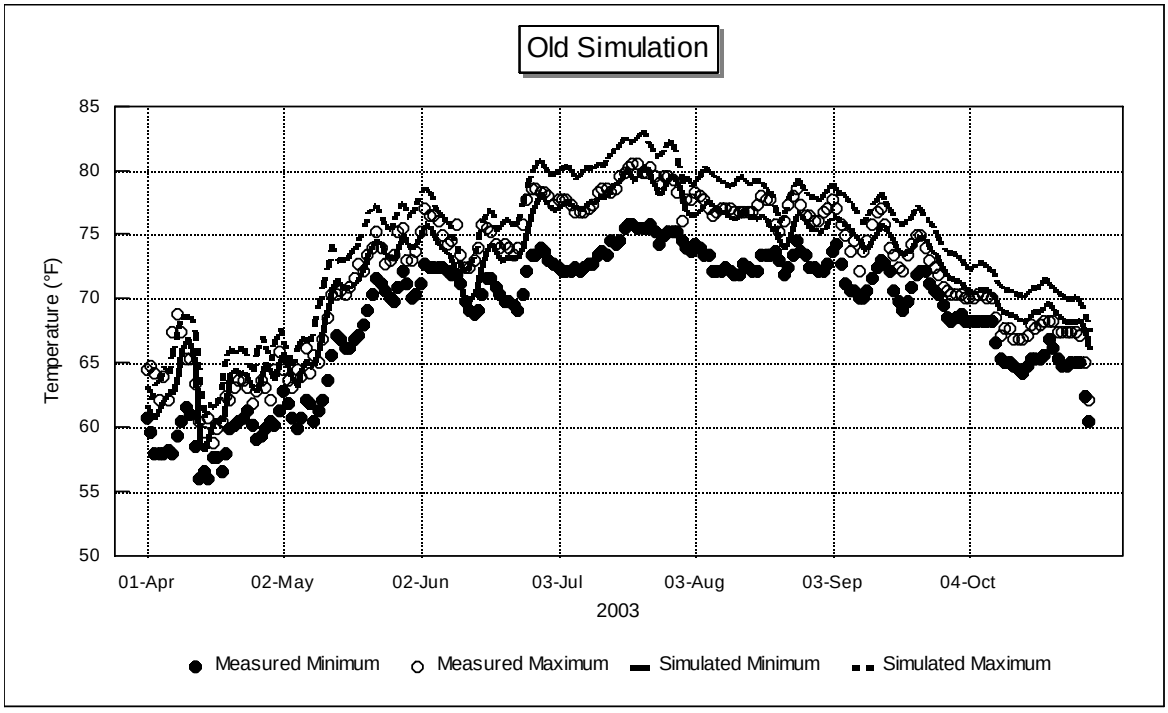


Figure 5. Water Temperature at the Alamitos Drop Structure during 2002, Comparison of Measured Temperatures to Old and New Simulated Temperatures



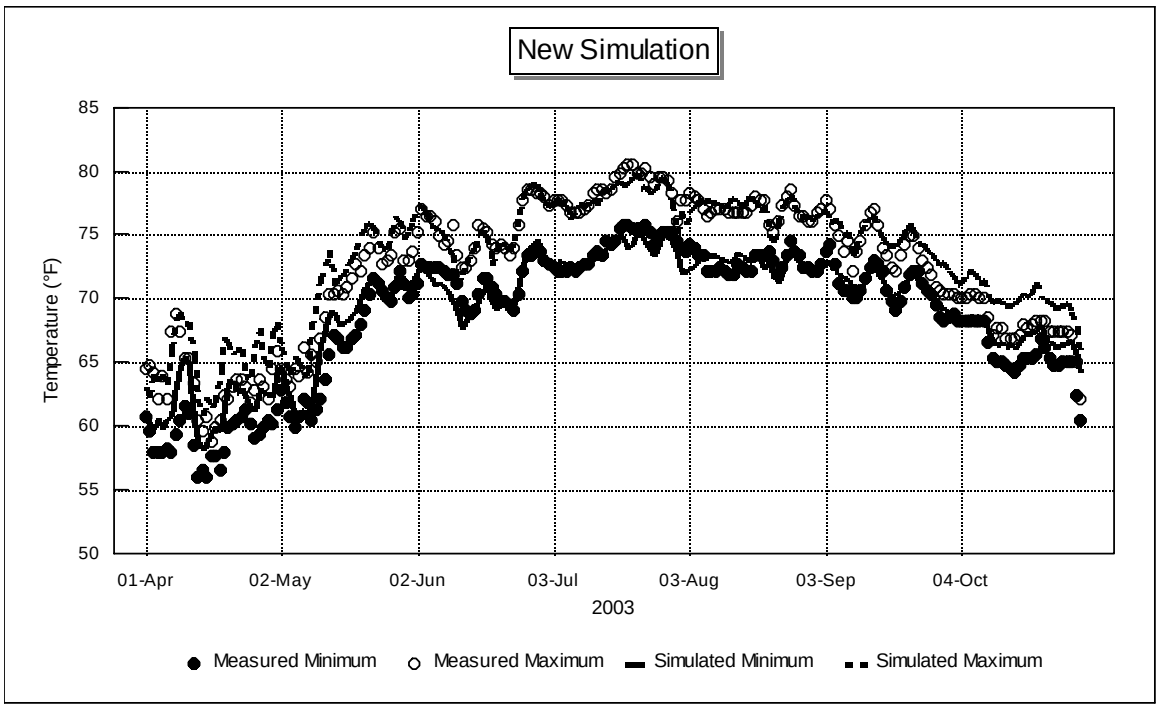
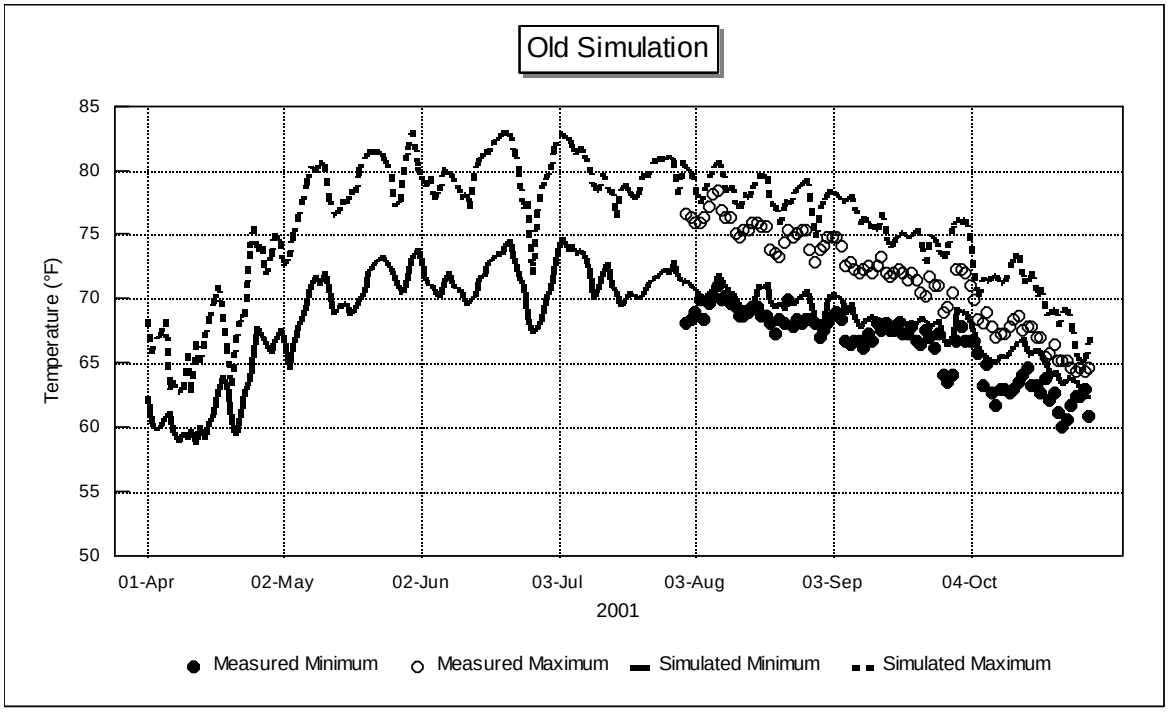


Figure 6. Water Temperature at the Alamitos Drop Structure during 2003, Comparison of Measured Temperatures to Old and New Simulated Temperatures



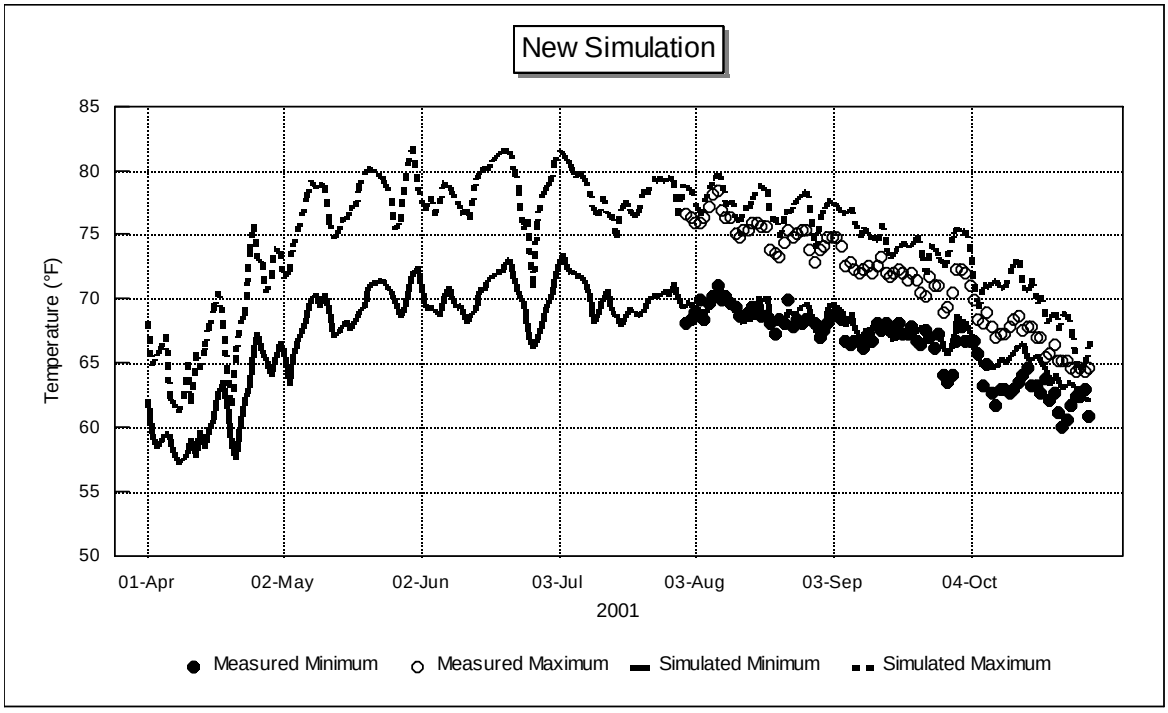


Figure 7. Water Temperature at Branham Lane during 2001, Comparison of Measured Temperatures to Old and New Simulated Temperatures

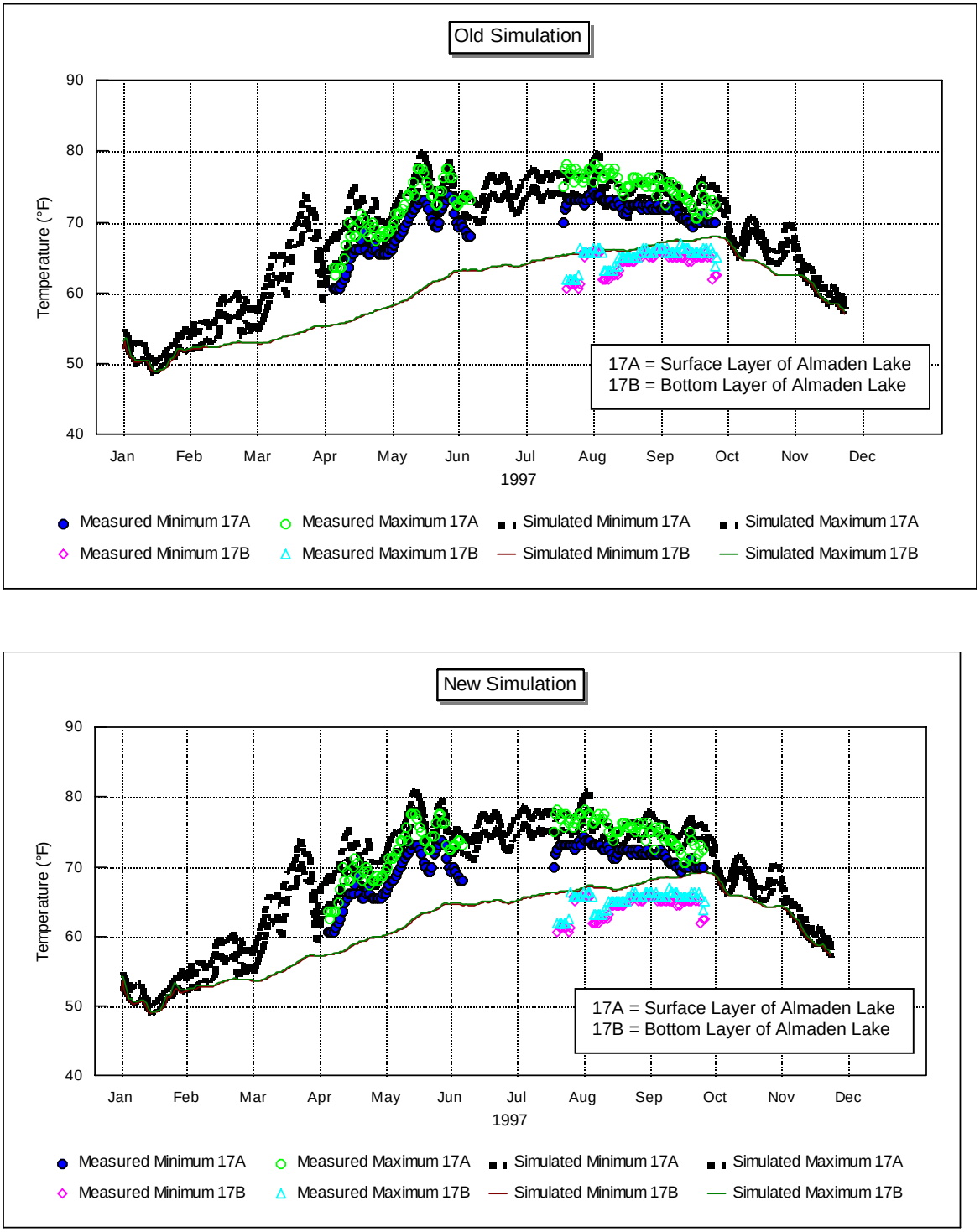


Figure 8. Water Temperature in Almaden Lake during 1997, Comparison of Measured Temperatures to Old and New Simulated Temperatures

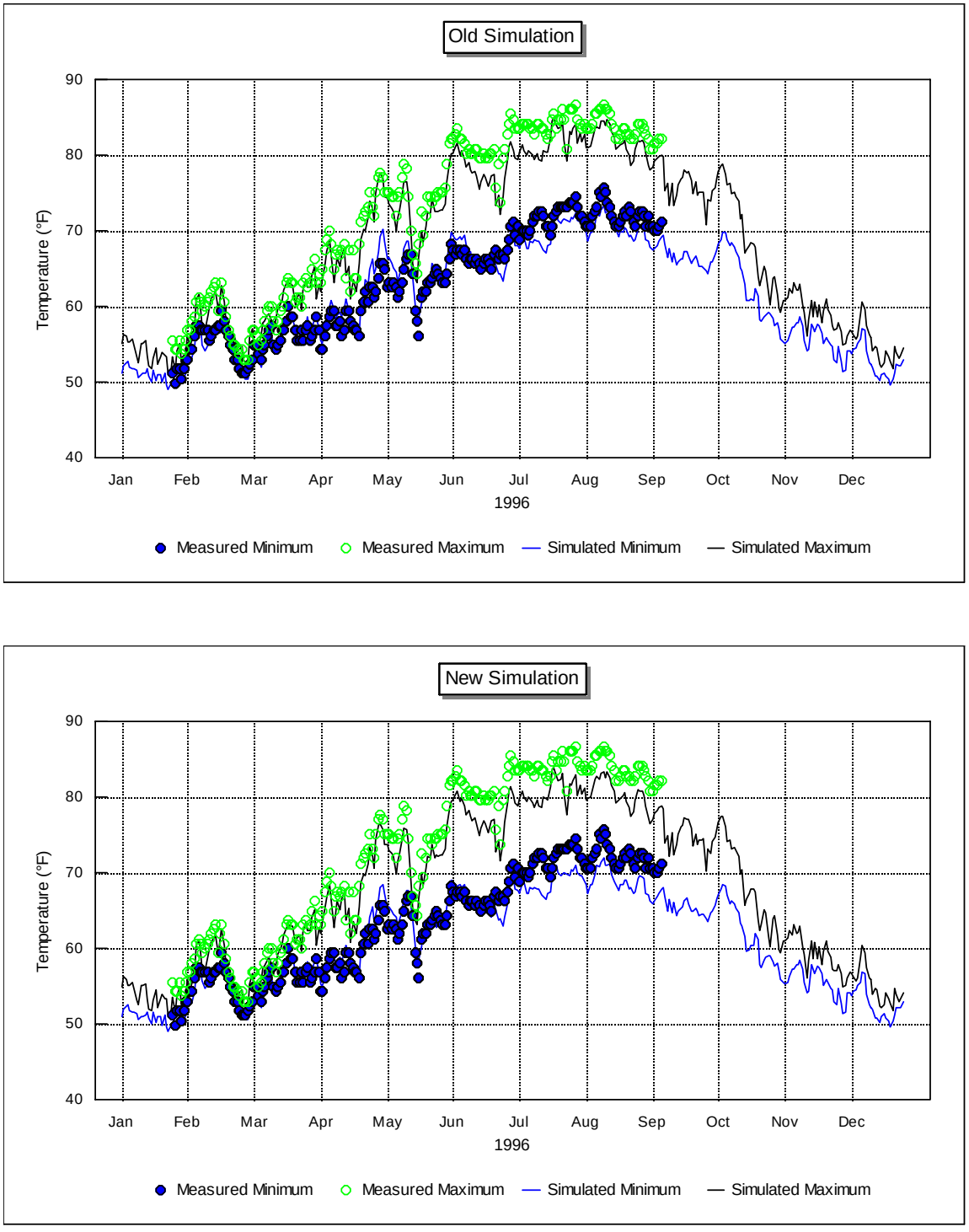


Figure 9. Water Temperature at Branham Lane during 1996, Comparison of Measured Temperatures to Old and New Simulated Temperatures

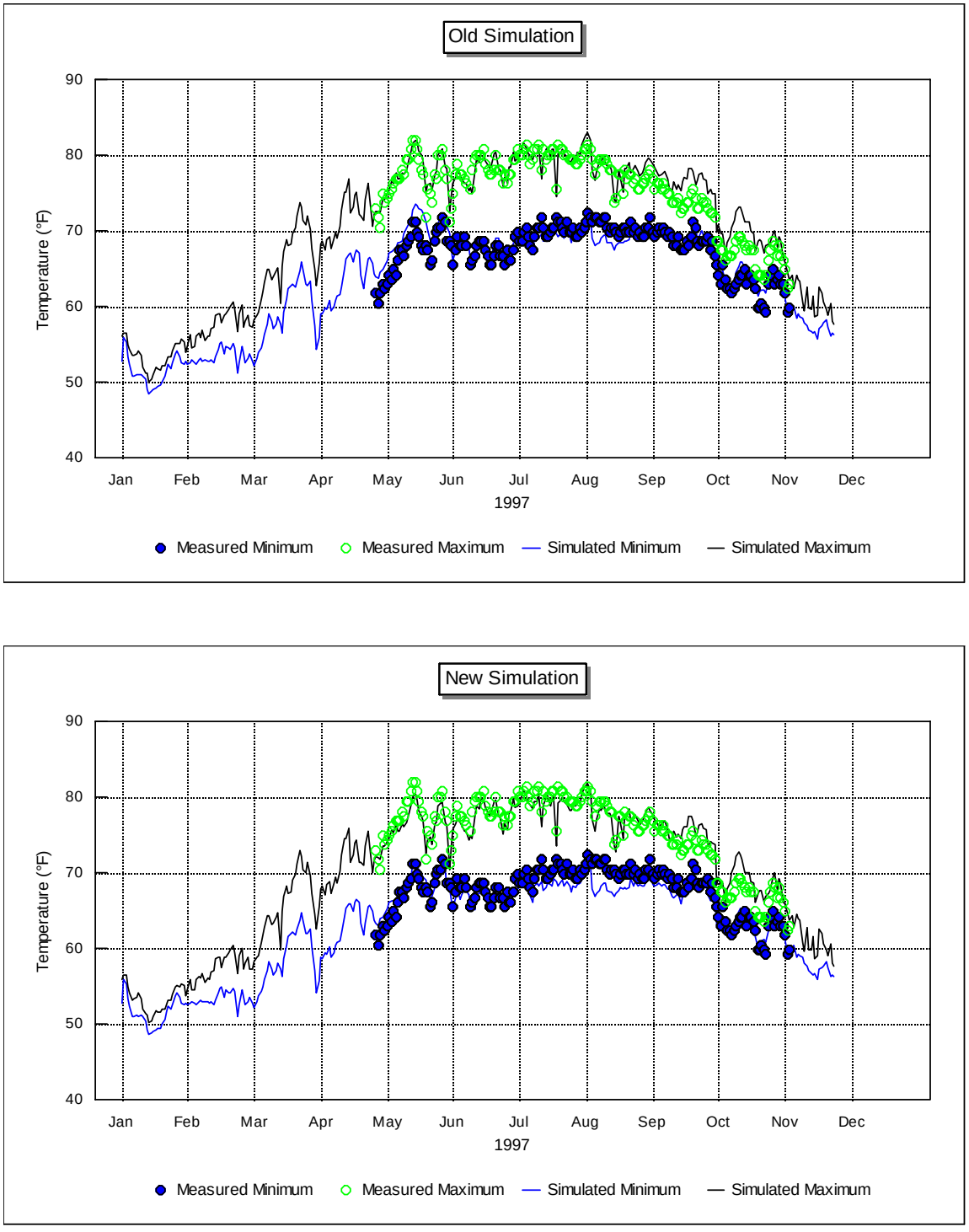
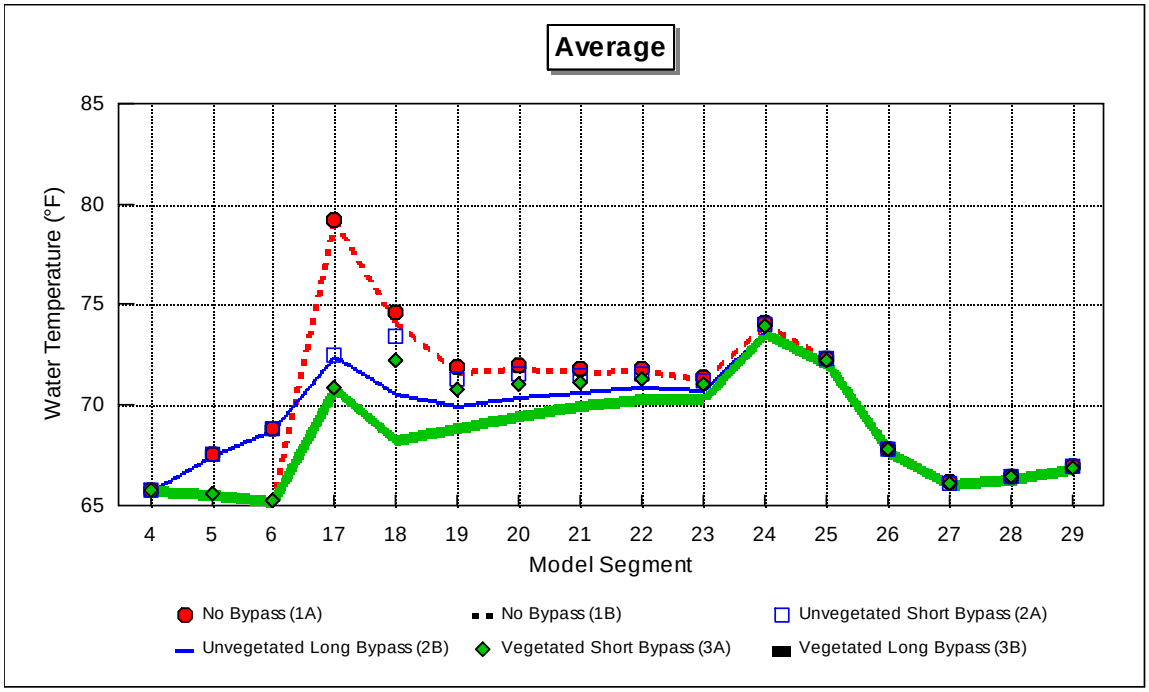


Figure 10. Water Temperature at Branham Lane during 1997, Comparison of Measured Temperatures to Old and New Simulated Temperatures



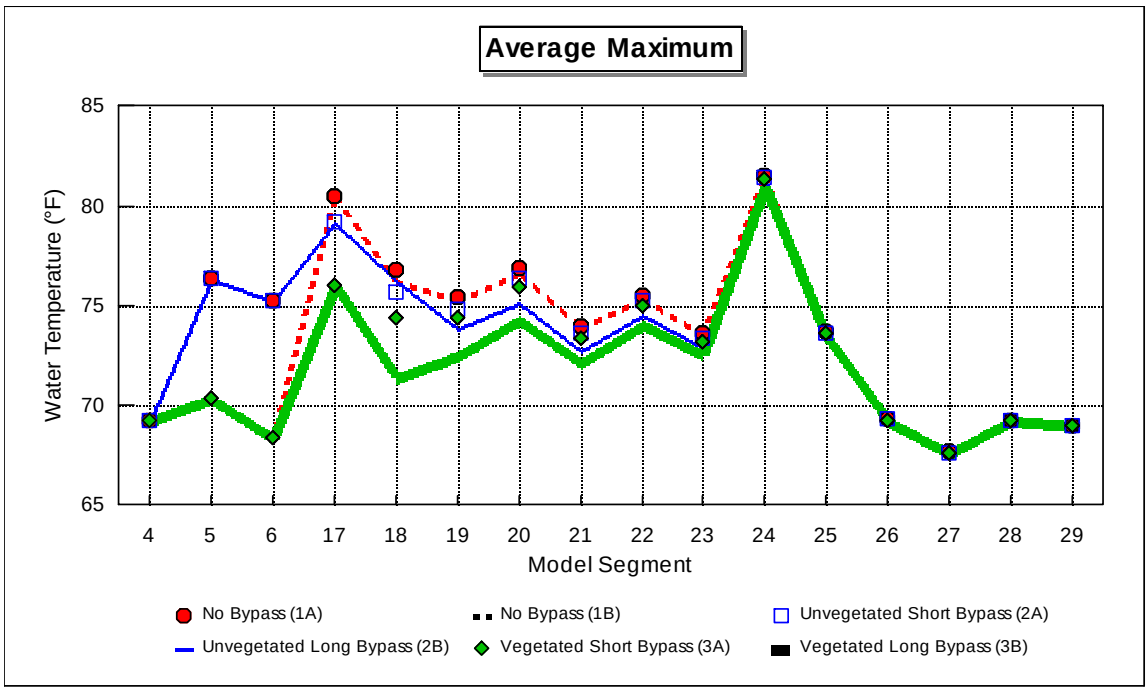
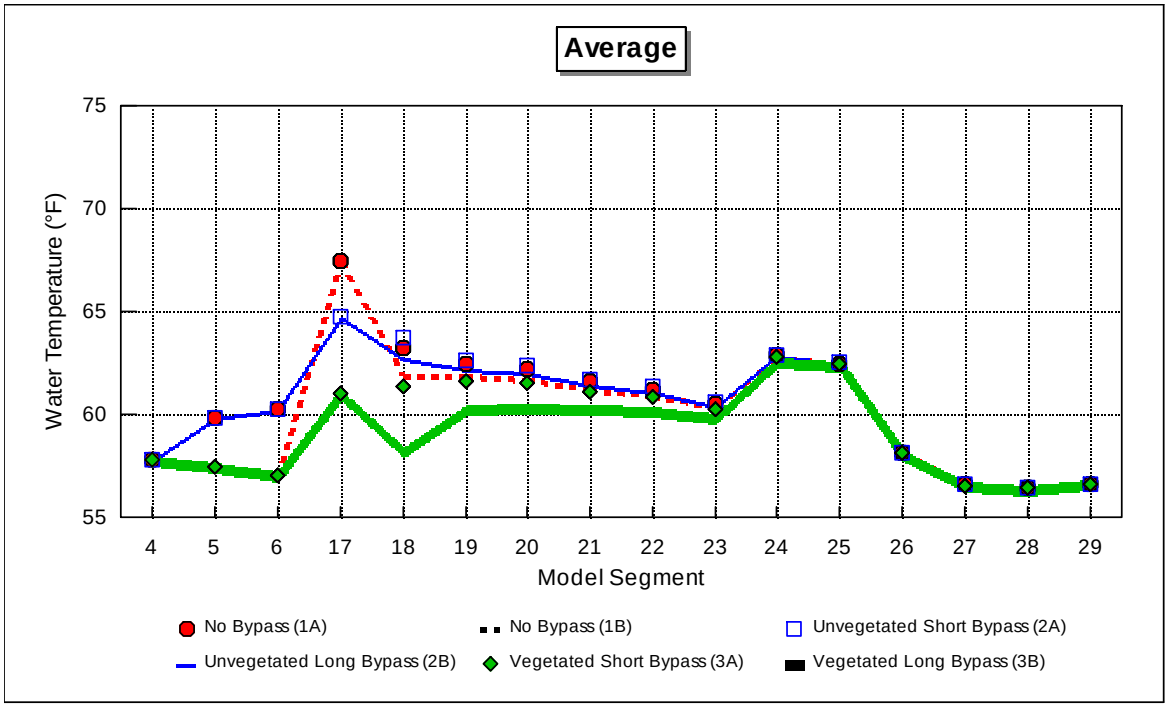


Figure 11. August Temperatures in Guadalupe Creek through the Upper Project Area during the Dry/Median Year



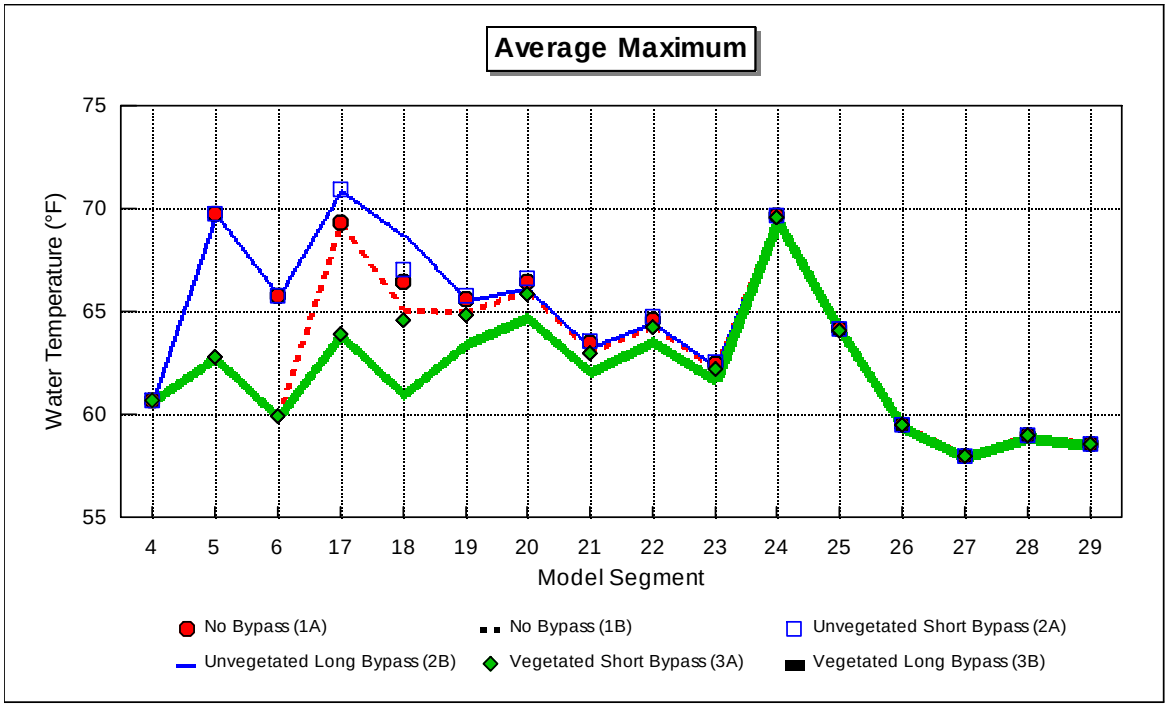
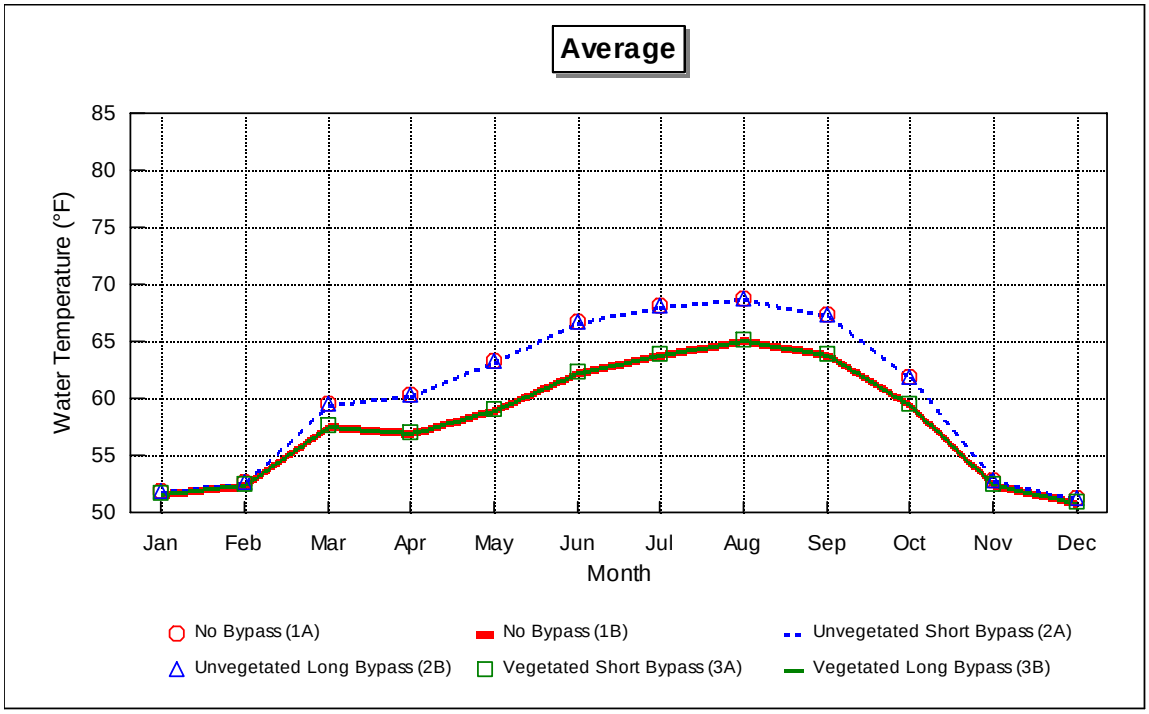


Figure 12. April Temperatures in Guadalupe Creek through the Upper Project Area during the Dry/Median Year



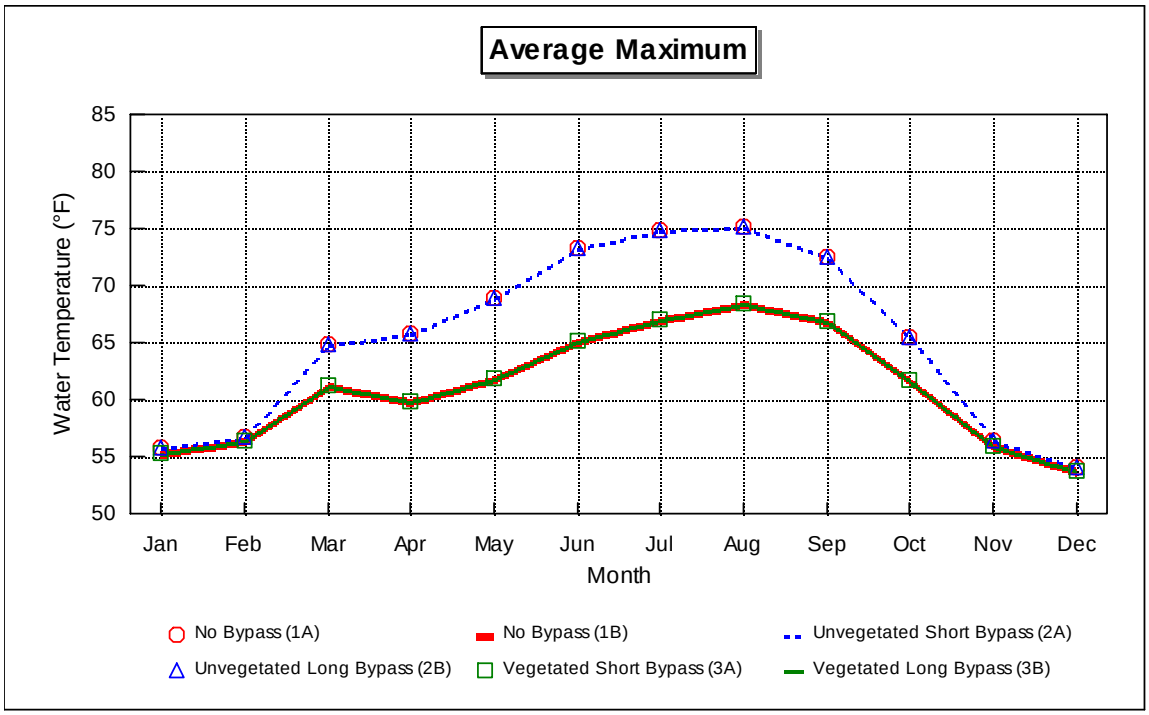
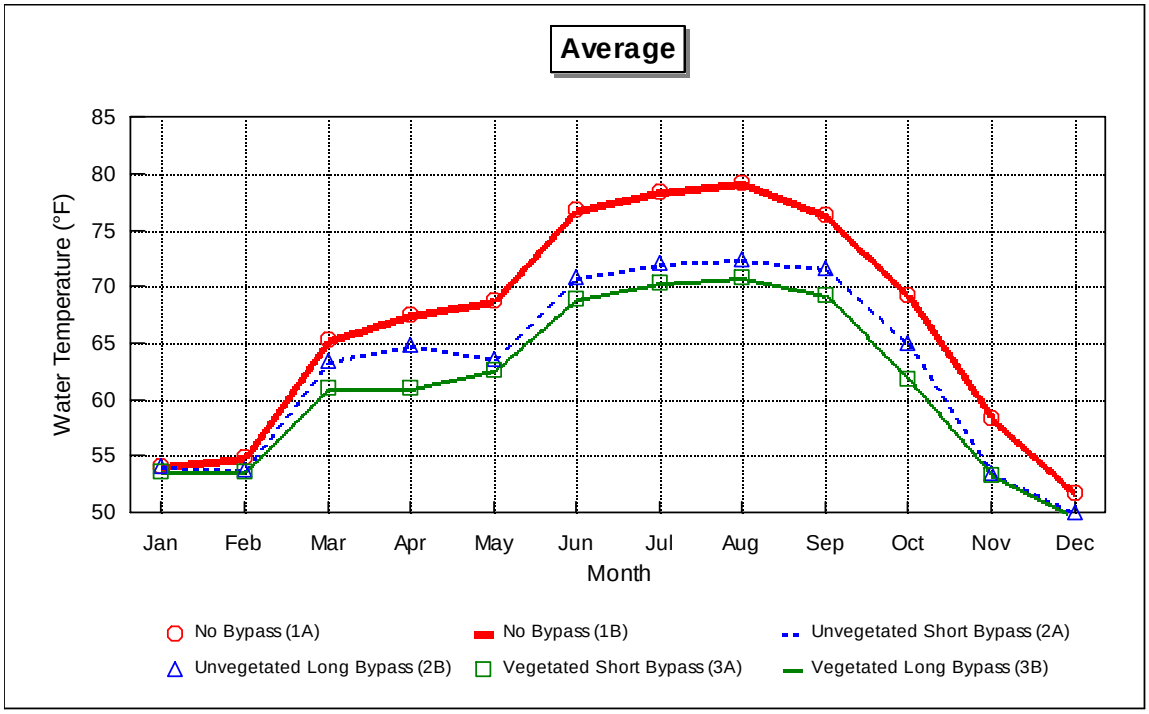


Figure 13. Monthly Temperatures in Model Segment 6, Lower Guadalupe Creek, during the Dry/Median Year



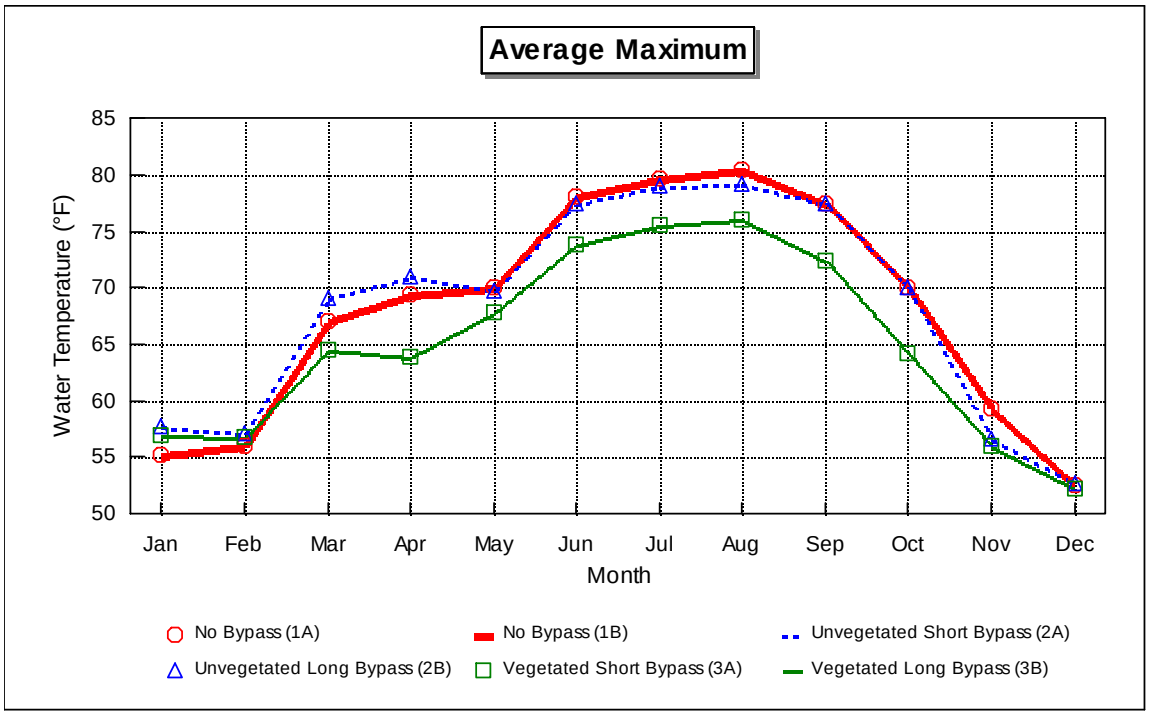
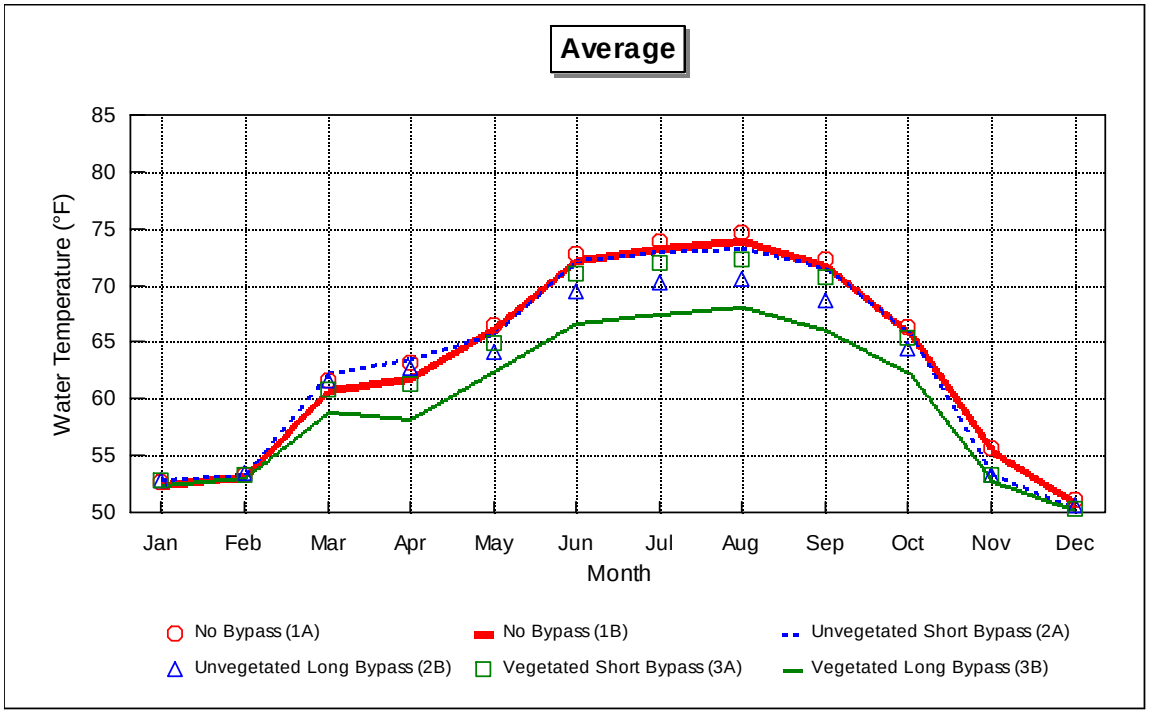


Figure 14. Monthly Temperatures in Model Segment 17, Lake Almaden Area, during the Dry/Median Year



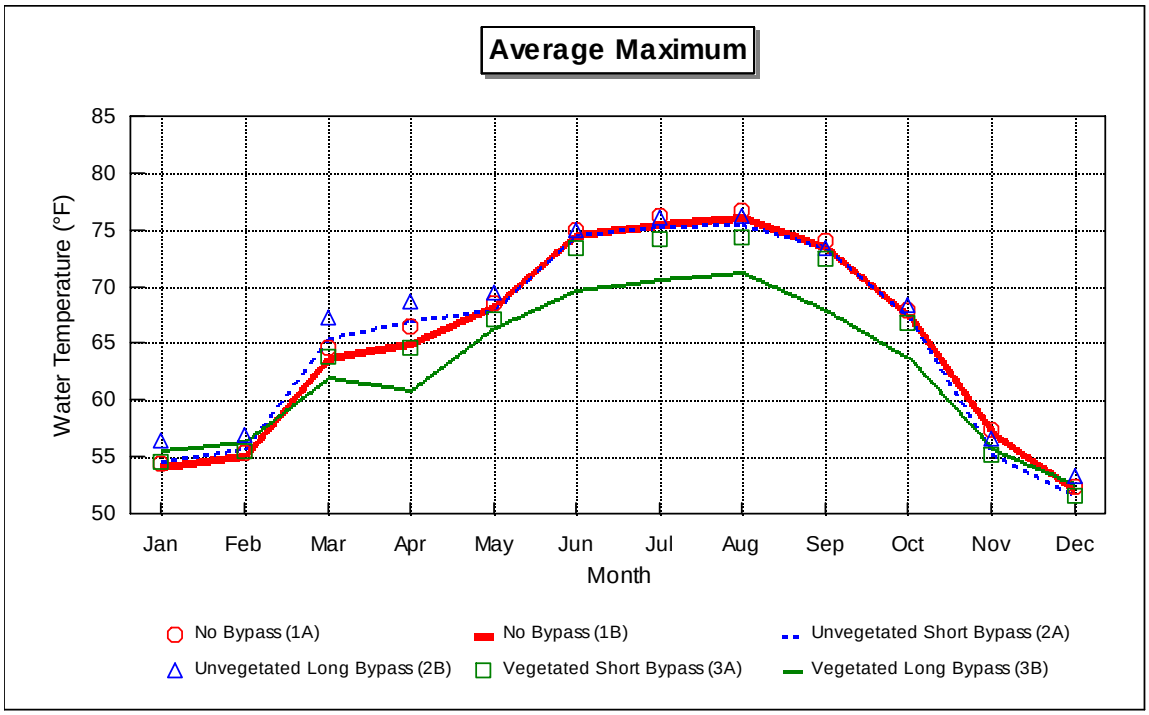
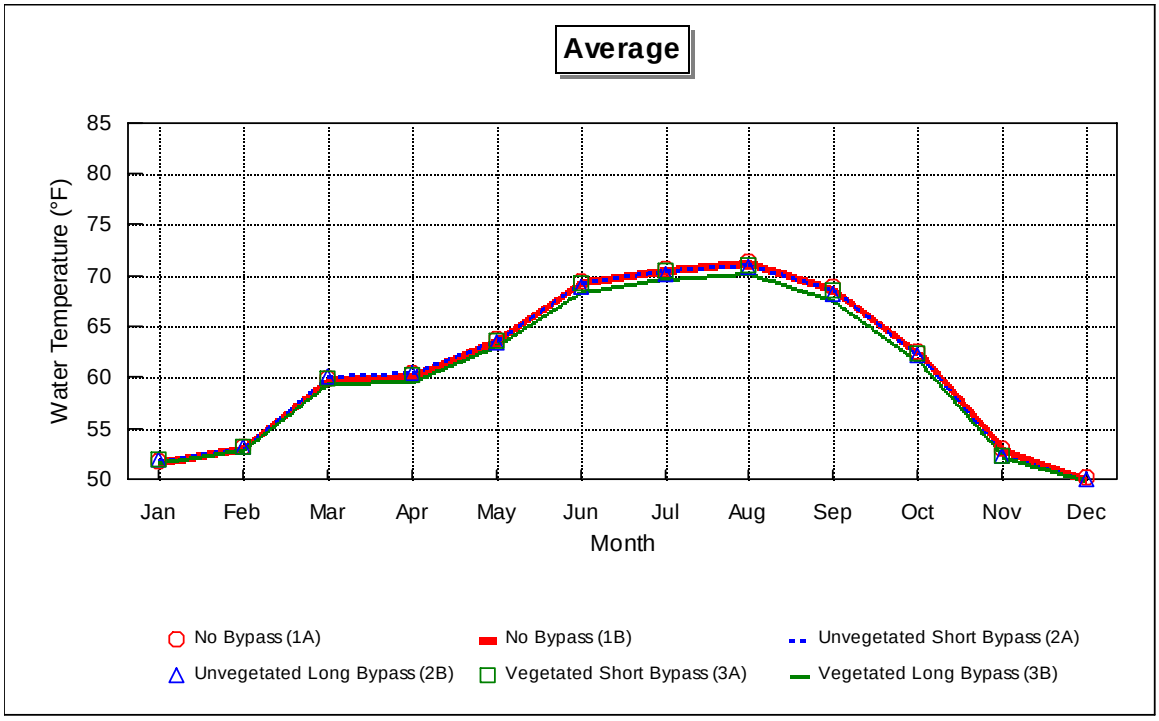


Figure 15. Monthly Temperatures in Model Segment 18, upstream of Alamitos Drop Structure, during the Dry/Median Year



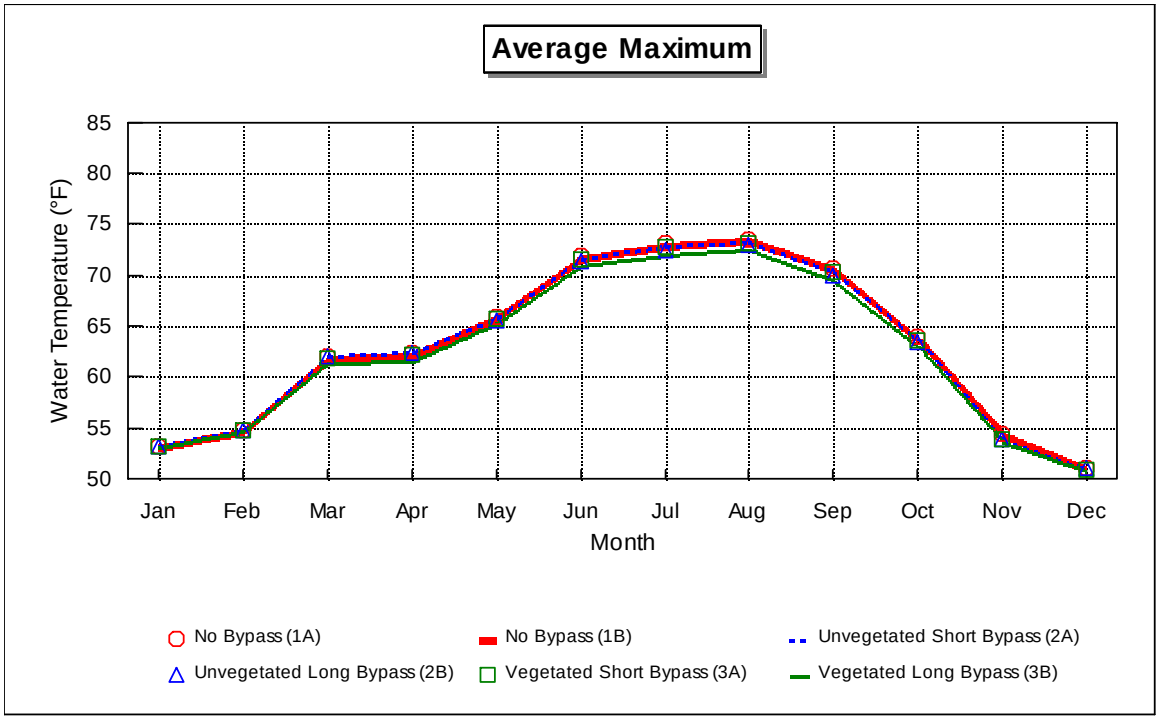


Figure 16. Monthly Temperatures in Model Segment 23, near Gage 23B, during the Dry/Median Year

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Temperature Data from Guadalupe River Downstream of Alamitos Drop Structure Station Number 30150-35 April 16, 2008 - November 22, 2016

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GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/16/2008	16.58917	15.55	17.93
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/17/2008	17.00542	15.7	18.55
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/18/2008	17.44042	16.39	18.96
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/19/2008	17.15708	16.17	18.43
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/20/2008	16.35917	15.6	17.41
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/21/2008	15.89167	15.03	17.05
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/22/2008	15.61	14.84	16.32
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/23/2008	16.10833	15.39	17.15
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/24/2008	16.15167	14.88	17.74
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/25/2008	16.48	15.1	18.12
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/26/2008	17.41708	15.84	19.27
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30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/29/2008	18.50708	17.41	19.91
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30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/2/2008	17.6	16.7	18.62
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30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/7/2008	18.85167	17.84	20.24
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30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/11/2008	19.10375	18.29	20.53
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/12/2008	18.9575	17.96	20.36
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/13/2008	19.085	17.84	20.65
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/14/2008	19.66958	18.39	21.19
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/15/2008	20.92125	19.41	22.77
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/16/2008	21.90083	20.55	23.83
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/17/2008	22.13417	20.86	24
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30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/19/2008	22.29042	21.27	23.73
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/20/2008	21.72125	20.62	23.23
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/21/2008	20.36542	19.46	21.81
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/22/2008	19.68583	18.79	21.03
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30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/26/2008	18.42208	17.72	19.69
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/27/2008	18.5275	17.65	19.81
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/28/2008	18.53	17.58	19.77
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30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/3/2008	19.33208	18.29	20.96
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/4/2008	19.40708	18.2	21.27
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/5/2008	19.56333	18.08	21.65

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
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30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/8/2008	20.03833	18.17	22.13
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/9/2008	20.63417	18.65	22.96
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/10/2008	21.06083	19.38	23.2
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/11/2008	21.04208	19.38	23.16
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/12/2008	21.30417	19.43	23.44
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/13/2008	21.4725	19.67	23.54
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/14/2008	21.45333	19.86	23.35
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/15/2008	21.45417	19.77	23.56
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/16/2008	21.39	19.81	23.37
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/17/2008	21.87875	20.53	23.83
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/18/2008	21.92417	20.38	23.97
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/19/2008	22.12292	20.41	24.26
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/20/2008	22.69083	20.93	24.89
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/21/2008	23.03208	21.7	24.62
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/22/2008	22.75292	21.41	24.7
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/23/2008	22.4675	21.19	24.26
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/24/2008	22.01792	20.69	23.71
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/25/2008	21.73208	20.41	23.44
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/26/2008	21.78167	20.38	23.44
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/27/2008	22.06667	20.67	23.85
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/28/2008	22.1425	20.86	23.88
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/29/2008	22.16875	20.98	24.05
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/30/2008	22.13417	21	23.8
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/1/2008	21.935	21.07	23.49
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/2/2008	21.99667	20.67	23.93
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/3/2008	22.3275	20.79	24.43
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/4/2008	22.37792	21.03	24.33
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/5/2008	22.62625	21.05	24.67
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/6/2008	23.19208	21.67	25.23
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/7/2008	23.76292	22.29	25.67
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/8/2008	24.37958	22.8	26.47
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/9/2008	24.74	23.16	26.64
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/10/2008	25.03208	23.64	26.91
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/11/2008	24.50917	23.23	26.18
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/12/2008	24.02583	22.84	25.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/13/2008	23.935	22.8	25.69
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/14/2008	23.93125	22.82	25.67
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/15/2008	23.73417	22.77	25.42
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/16/2008	23.43125	22.36	25.11
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/17/2008	23.45417	22.32	25.18
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/18/2008	23.43125	22.44	24.99
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/19/2008	23.27542	22.2	24.99
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/20/2008	22.8	21.93	24.36
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/21/2008	22.31625	21.46	23.78
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/22/2008	22.44292	21.24	24.29
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/23/2008	22.68625	21.34	24.7
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/24/2008	22.68375	21.29	24.65
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/25/2008	22.61875	21.29	24.38
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/26/2008	22.82083	21.46	24.82

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/27/2008	22.8475	21.7	24.6
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/28/2008	22.94042	22.01	24.6
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/29/2008	22.825	21.84	24.5
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/30/2008	22.62917	21.39	24.41
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/31/2008	22.59625	21.43	24.41
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/1/2008	22.39292	21.07	24.17
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/2/2008	22.63333	21.41	24.53
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/3/2008	22.48125	21.22	24.26
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/4/2008	22.57292	21.53	24.26
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/5/2008	22.51125	21.55	24.12
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/6/2008	22.50833	21.53	23.88
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/7/2008	22.54042	21.65	24.07
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/8/2008	22.44208	21.58	24
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/9/2008	22.36542	21.36	23.95
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/10/2008	22.44458	21.22	24.05
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/11/2008	22.775	21.55	24.48
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/12/2008	22.95167	21.81	24.55
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/13/2008	23.13833	21.93	24.79
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/14/2008	23.45333	22.46	24.99
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/15/2008	23.55167	22.46	25.11
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/16/2008	23.67583	22.63	25.33
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/17/2008	23.40708	22.39	25.01
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/18/2008	22.95708	22.2	24.38
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/19/2008	22.78833	22.05	24.17
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/20/2008	22.79458	21.98	24.12
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/21/2008	23.0875	22.17	24.58
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/22/2008	23.02875	21.77	24.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/23/2008	23.05708	21.93	24.67
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/24/2008	23.15417	21.98	24.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/25/2008	23.275	22.15	24.87
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/26/2008	23.05958	21.86	24.6
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/27/2008	23.15958	21.93	24.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/28/2008	23.61333	22.46	25.11
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/29/2008	24.03708	22.94	25.62
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/30/2008	23.83167	22.89	25.28
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/31/2008	23.00625	22.15	24.31
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/1/2008	22.28167	21.39	23.59
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/2/2008	21.95542	20.84	23.42
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/3/2008	22.00167	20.72	23.64
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/4/2008	22.32167	21.05	23.95
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/5/2008	22.54208	21.29	24
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/6/2008	22.74042	21.62	24.14
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/7/2008	22.81708	21.72	24.36
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/8/2008	22.53792	21.58	23.93
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/9/2008	22.28	21.53	23.59
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/10/2008	22.22292	21.5	23.49
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/11/2008	22.12125	21.34	23.47
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/12/2008	21.97667	21.24	23.3
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/13/2008	21.8125	20.96	23.11
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/14/2008	21.61458	20.81	22.92
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/15/2008	21.46625	20.77	22.48

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/16/2008	21.42292	20.84	22.39
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/17/2008	21.1975	20.57	22.25
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/18/2008	20.61042	19.81	21.6
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/19/2008	20.39583	19.43	21.39
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/20/2008	20.61375	20.05	21.55
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/21/2008	20.60333	19.88	21.7
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/22/2008	20.42375	19.43	21.48
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/23/2008	20.51333	19.46	21.53
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/24/2008	20.58417	19.65	21.6
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/25/2008	20.70375	19.81	21.62
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/26/2008	21.06292	20.24	22.08
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/27/2008	21.33542	20.46	22.34
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/28/2008	21.41042	20.65	22.39
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/29/2008	21.21708	20.67	22.05
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/30/2008	20.97167	20.17	21.89
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/1/2008	20.98375	20.19	21.93
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/2/2008	20.87708	20.29	21.67
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/3/2008	20.74792	20.22	21.46
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/4/2008	20.53417	19.96	21.1
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/5/2008	19.7825	19.24	20.43
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/6/2008	20.04583	19.41	21.07
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/7/2008	20.24417	19.5	21.41
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/8/2008	20.20083	19.43	21.22
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/9/2008	19.53625	18.93	20.38
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/10/2008	18.57625	18.05	19.19
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/11/2008	17.5825	17.05	18.2
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/12/2008	16.84583	16.24	17.55
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/13/2008	17.0675	16.01	18.22
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/14/2008	17.31542	16.39	18.2
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/15/2008	17.59333	16.67	18.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/16/2008	17.83458	16.89	18.77
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/17/2008	18.01625	17.17	18.86
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/18/2008	17.97375	17.27	18.86
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/19/2008	17.69833	17.22	18.41
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/20/2008	17.51667	16.96	18.24
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/21/2008	17.32042	16.58	18.08
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/22/2008	17.40542	16.55	18.15
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/23/2008	17.62083	16.84	18.36
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/24/2008	17.60208	16.82	18.29
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/25/2008	17.59208	16.86	18.29
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/26/2008	17.48875	16.77	18.2
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/27/2008	17.56667	17.15	18.15
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/28/2008	17.45625	17.01	18.12
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/29/2008	17.22958	16.67	17.84
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/30/2008	16.84792	16.67	17.13
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/31/2008	17.16083	16.48	17.96
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/1/2008	17.36042	17.17	17.67
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/2/2008	17.47958	16.91	18.41
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/3/2008	16.89292	16.67	17.32
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/4/2008	16.26917	15.77	16.67
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/5/2008	15.67333	15.12	16.15

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/6/2008	15.84208	15.1	16.58
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/7/2008	15.97125	15.27	16.79
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/8/2008	15.85125	15.48	16.12
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/9/2008	15.49458	15.22	15.89
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/10/2008	15.51625	15.1	16.24
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/11/2008	15.58833	15.36	16.03
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/12/2008	15.75458	15.43	16.41
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/13/2008	16.13958	15.6	16.84
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/14/2008	16.26042	15.72	16.84
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/15/2008	16.24542	15.62	16.79
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/16/2008	16.13208	15.48	16.77
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/17/2008	16.185	15.58	16.82
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/18/2008	15.95917	15.43	16.55
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/19/2008	15.765	15.41	16.15
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/20/2008	15.47625	15.22	15.93
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/21/2008	15.08792	14.64	15.55
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/22/2008	14.53958	14.02	15.1
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/23/2008	14.45542	13.9	14.91
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/24/2008	14.47292	14.21	14.69
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/25/2008	14.28333	14.09	14.52
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/26/2008	14.29625	14.07	14.57
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/27/2008	14.46083	14.26	14.81
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/28/2008	14.34375	14.05	14.45
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/29/2008	14.29167	13.81	15.03
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/30/2008	14.27583	13.76	14.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	12/1/2008	14.04208	13.73	14.43
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	12/2/2008	13.95	13.95	13.95
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/25/2012	19.13058	19.13058	19.13058
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/26/2012	18.76924	17.099423	19.747892
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/27/2012	18.18262	16.053975	21.460436
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/28/2012	18.70618	16.332761	22.237054
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/29/2012	19.44172	16.93016	22.953933
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/30/2012	19.91798	17.686865	23.362156
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/1/2012	19.40065	17.706779	22.744844
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/2/2012	18.70286	16.740984	22.197228
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/3/2012	18.27016	16.72107	20.176028
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/4/2012	18.57259	17.358296	19.767805
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/5/2012	18.15358	16.950073	19.04097
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/6/2012	18.36558	17.567386	19.230146
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/7/2012	18.84142	18.284264	19.887285
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/8/2012	19.48031	18.373874	20.88295
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/9/2012	19.84331	19.110666	21.171693
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/10/2012	19.58153	18.702444	20.843123
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/11/2012	19.74955	18.821923	21.271259
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/12/2012	19.82879	18.851793	21.221476
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/13/2012	19.98976	19.13058	21.410652
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/14/2012	19.69064	19.04097	21.101996
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/15/2012	18.97542	18.284264	20.106331
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/16/2012	19.05508	18.164785	20.315421
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/17/2012	19.38738	18.632747	20.843123
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/18/2012	19.19737	18.184698	20.504597

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/19/2012	19.4438	18.423657	20.813253
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/20/2012	19.72715	18.851793	21.15178
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/21/2012	19.78855	18.871707	20.982517
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/22/2012	19.8989	19.13058	21.221476
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/23/2012	19.494	18.752227	20.79334
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/24/2012	19.29943	18.543137	20.484684
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/25/2012	18.65349	18.134915	19.230146
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/26/2012	18.30127	17.617169	19.16045
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/27/2012	18.13533	17.477776	19.04097
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/28/2012	18.30376	17.617169	19.538802
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/29/2012	18.35604	17.378209	19.658282
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/30/2012	19.01774	17.945738	20.385118
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/31/2012	19.94993	18.752227	21.480349
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/1/2012	20.7672	19.797675	22.286838
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/2/2012	20.76057	19.887285	22.167358
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/3/2012	20.80537	19.867372	22.097661
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/4/2012	20.18018	19.389453	20.604164
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/5/2012	19.06628	18.473441	19.956982
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/6/2012	18.80948	17.905912	20.006765
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/7/2012	19.10444	18.134915	20.176028
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/8/2012	19.52553	18.732314	20.693774
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/9/2012	19.6811	18.612834	21.00243
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/10/2012	20.14201	18.941403	21.858702
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/11/2012	20.81533	19.698109	22.147445
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/12/2012	21.19949	20.195941	22.595494
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/13/2012	21.36336	20.414987	22.625364
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/14/2012	21.44052	20.534467	22.794627
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/15/2012	21.28163	20.265638	22.386404
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/16/2012	22.04414	21.072126	23.192893
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/17/2012	22.61956	21.739222	24.039208
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/18/2012	22.32293	21.360869	23.800248
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/19/2012	21.94458	20.91282	23.392026
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/20/2012	22.12961	21.072126	23.392026
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/21/2012	21.97694	21.291173	23.033586
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/22/2012	21.4567	20.743557	22.286838
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/23/2012	21.15634	20.454814	22.127531
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/24/2012	20.71618	19.956982	21.689439
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/25/2012	20.35898	19.489019	21.410652
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/26/2012	20.47597	19.558716	21.789005
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/27/2012	20.79417	19.797675	22.047878
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/28/2012	21.06549	20.146158	22.336621
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/29/2012	21.36419	20.554381	22.555667
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/30/2012	21.89438	20.952647	23.103283
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/1/2012	22.26195	21.480349	23.392026
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/2/2012	22.61333	21.739222	23.919728
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/3/2012	22.45569	21.500262	23.601115
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/4/2012	22.61541	21.550046	23.840075
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/5/2012	22.59093	21.888572	23.630985
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/6/2012	22.15367	21.291173	23.192893
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/7/2012	22.41296	21.430566	23.601115
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/8/2012	22.66602	21.769092	23.840075

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/9/2012	22.65357	21.888572	23.650899
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/10/2012	22.86225	21.858702	24.158688
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/11/2012	23.3244	22.217141	24.636607
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/12/2012	23.70773	22.764757	24.995046
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/13/2012	23.37004	22.525797	24.65652
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/14/2012	23.02446	22.167358	24.079035
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/15/2012	22.87884	22.027965	24.108905
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/16/2012	22.68925	21.719309	23.840075
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/17/2012	22.58139	21.888572	23.431852
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/18/2012	22.13209	21.480349	23.242676
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/19/2012	21.96034	21.271259	23.103283
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/20/2012	22.07484	21.221476	23.242676
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/21/2012	22.73364	21.789005	24.198514
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/22/2012	23.18916	22.197228	24.65652
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/23/2012	23.30656	22.266924	24.517127
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/24/2012	23.21737	22.436187	24.537041
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/25/2012	22.51128	21.649612	23.889858
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/26/2012	22.29721	21.500262	23.601115
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/27/2012	22.26817	21.380783	23.750465
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/28/2012	22.17358	21.380783	23.531419
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/29/2012	22.14744	21.360869	23.481636
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/30/2012	22.33994	21.340956	23.750465
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/31/2012	22.90788	21.928398	24.278168
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/1/2012	23.01118	21.928398	24.537041
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/2/2012	23.02156	21.978182	24.397647
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/3/2012	22.90415	21.908485	24.347864
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/4/2012	22.45693	21.908485	23.17298
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/5/2012	22.26651	21.669525	23.242676
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/6/2012	22.20096	21.380783	23.222763
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/7/2012	22.41088	21.530132	23.551332
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/8/2012	22.55318	21.550046	23.750465
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/9/2012	22.89253	21.888572	24.108905
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/10/2012	23.20451	22.286838	24.447431
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/11/2012	23.3551	22.406317	24.586824
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/12/2012	23.51648	22.645277	24.756087
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/13/2012	23.78365	22.914107	24.995046
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/14/2012	23.88571	23.123196	25.0747
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/15/2012	23.72972	22.983803	24.92535
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/16/2012	23.43973	22.764757	24.447431
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/17/2012	23.25886	22.575581	24.108905
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/18/2012	23.16095	22.555667	24.108905
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/19/2012	22.91908	22.266924	23.800248
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/20/2012	22.86806	22.217141	23.770379
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/21/2012	22.8581	22.167358	23.820162
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/22/2012	22.71663	22.008051	23.601115
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/23/2012	22.67349	21.958268	23.800248
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/24/2012	22.53783	21.719309	23.650899
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/25/2012	22.37562	21.719309	23.411939
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/26/2012	22.05452	21.460436	22.93402
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/27/2012	21.80228	21.072126	22.764757
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/28/2012	22.02548	21.221476	23.123196

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/29/2012	22.06779	21.101996	23.272546
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/30/2012	22.28103	21.380783	23.461722
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/31/2012	21.89065	21.430566	22.625364
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/1/2012	21.73673	21.12191	22.675147
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/2/2012	21.4986	20.693774	22.436187
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/3/2012	21.78486	20.88295	22.834453
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/4/2012	21.9927	21.221476	23.0535
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/5/2012	21.8027	21.460436	22.336621
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/6/2012	21.72304	21.191606	22.675147
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/7/2012	21.57452	20.952647	22.406317
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/8/2012	21.56125	21.00243	22.316708
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/9/2012	21.31109	20.693774	22.127531
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/10/2012	21.1273	20.365204	22.077748
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/11/2012	21.21359	20.345291	22.237054
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/12/2012	21.24803	20.484684	22.167358
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/13/2012	21.62182	20.932733	22.625364
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/14/2012	21.71143	21.12191	22.595494
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/15/2012	21.74876	21.15178	22.595494
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/16/2012	21.63177	21.101996	22.356534
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/17/2012	21.36419	20.91282	22.047878
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/18/2012	21.01778	20.653947	21.550046
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/19/2012	20.7112	20.295508	21.291173
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/20/2012	20.43615	19.937068	21.0323
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/21/2012	20.24614	19.727979	20.76347
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/22/2012	20.44237	19.817588	21.12191
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/23/2012	20.57678	19.937068	21.340956
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/24/2012	20.49132	19.867372	21.171693
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/25/2012	20.41789	19.867372	21.072126
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/26/2012	20.39549	19.867372	21.171693
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/27/2012	20.42328	19.747892	21.241389
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/28/2012	20.53862	19.917155	21.271259
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/29/2012	20.7141	20.146158	21.480349
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/30/2012	20.92858	20.225811	21.739222
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/1/2012	21.15344	20.504597	21.928398
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/2/2012	21.27292	20.604164	22.047878
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/3/2012	21.48989	20.952647	22.147445
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/4/2012	21.14348	20.723644	21.649612
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/5/2012	20.79293	20.574294	21.00243
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/6/2012	20.34571	20.106331	20.554381
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/7/2012	19.88355	19.558716	20.126245
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/8/2012	19.58319	19.269973	19.797675
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/9/2012	19.43509	19.180363	19.608499
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/10/2012	19.43426	19.250059	19.628412
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/11/2012	19.23844	19.04097	19.459149
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/12/2012	18.79786	18.612834	19.0111
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/13/2012	18.52696	18.234481	18.941403
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/14/2012	18.66511	18.304178	19.080796
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/15/2012	18.97293	18.612834	19.389453
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/16/2012	19.28034	18.871707	19.698109
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/17/2012	19.50312	19.04097	20.006765
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/18/2012	19.47118	18.991187	19.956982

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/19/2012	19.91964	19.628412	20.295508
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/20/2012	19.82132	19.628412	20.106331
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/21/2012	19.07997	18.702444	19.558716
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/22/2012	18.41992	18.204611	18.68253
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/23/2012	17.90882	17.706779	18.304178
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/24/2012	17.74868	17.358296	18.234481
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/25/2012	17.85414	17.736649	18.045305
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/11/2013	19.58375	17.24	21.29
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/12/2013	18.10375	15	22.03
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/13/2013	18.15292	15.79	21.79
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/14/2013	17.72625	15.34	21.2
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/15/2013	17.44125	15.46	20.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/16/2013	16.44583	14.2	20.29
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/17/2013	16.90792	14.6	20.17
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/18/2013	17.31542	14.5	21.15
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/19/2013	18.34917	15.41	22.44
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/20/2013	19.17375	16.51	22.84
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/21/2013	19.59167	16.7	23.52
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/22/2013	20.1725	17.41	24
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/23/2013	20.39958	18.31	22.6
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/24/2013	20.30625	18.86	21.48
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/25/2013	19.63708	18.93	20.34
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/26/2013	19.40417	19	20.19
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/27/2013	19.32458	18.93	20.12
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/28/2013	19.78833	19.05	20.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/29/2013	20.47875	19.67	21.86
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/30/2013	20.04083	19.38	21.15
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/1/2013	19.87292	19.05	20.9
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/2/2013	19.84375	19.15	20.98
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/3/2013	19.62833	18.91	20.93
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/4/2013	19.895	19.05	21.41
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/5/2013	19.5425	18.84	20.4
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/6/2013	19.16458	18.5	20.05
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/7/2013	18.75375	17.81	19.65
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/8/2013	17.91083	17.41	18.84
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/9/2013	17.85542	17.08	19.05
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/10/2013	18.365	17.39	19.67
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/11/2013	19.29583	18	20.93
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/12/2013	19.81292	18.77	21.34
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/13/2013	20.10125	19.19	21.62
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/14/2013	20.22167	19.2	21.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/15/2013	19.77042	19	21.1
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/16/2013	19.14083	18.5	20
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/17/2013	18.73417	17.96	20.03
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/18/2013	18.65625	17.65	20
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/19/2013	19.23417	18.17	20.84
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/20/2013	19.75208	18.6	21.34
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/21/2013	19.75958	18.96	21.07
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/22/2013	19.10458	18.29	20.26
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/23/2013	18.74	17.96	20.03
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/24/2013	18.5725	17.58	20.1

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/25/2013	18.59792	17.6	19.91
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/26/2013	18.91958	18	20.17
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/27/2013	18.71875	18.29	19.2
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/28/2013	19.12792	18.5	20.17
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/29/2013	19.1725	18.43	20.5
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/30/2013	19.29	18.15	20.67
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/31/2013	19.76792	18.55	21.36
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/1/2013	20.59708	19.34	22.15
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/2/2013	21.11667	20.07	22.56
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/3/2013	21.2675	20.03	22.68
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/4/2013	21.225	20.19	22.82
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/5/2013	21.2325	20.19	22.82
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/6/2013	21.37792	20.34	22.96
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/7/2013	21.73833	20.55	23.32
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/8/2013	22.63875	21.72	24.19
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/9/2013	22.8475	21.86	24.21
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/10/2013	22.69042	21.74	23.78
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/11/2013	22.38875	21.34	23.08
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/12/2013	21.4875	20.74	22.82
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/13/2013	21.22792	20.36	22.6
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/14/2013	21.1	20.07	22.51
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/15/2013	21.21375	20.26	22.68
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/16/2013	21.19833	20.4	22.41
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/17/2013	21.16083	20.5	22.48
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/18/2013	21.1625	20.48	22.1
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/19/2013	20.59083	19.9	21.65
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/20/2013	20.47542	19.7	21.77
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/21/2013	20.44792	19.53	21.74
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/22/2013	20.79208	19.84	22.34
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/23/2013	20.66917	20.26	21.15
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/24/2013	20.86583	20.53	21.43
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/25/2013	21.20792	20.41	22.58
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/26/2013	21.50417	20.74	22.7
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/27/2013	21.74958	20.7	23.37
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/28/2013	22.94292	21	24.65
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/29/2013	23.88	23	25.42
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/30/2013	23.99875	23	25.18
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/1/2013	23.80708	22.9	25.01
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/2/2013	24.46083	23.59	26.06
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/3/2013	24.17	23	25.33
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/4/2013	24.32375	23.49	25.67
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/5/2013	24.10875	23	25.35
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/6/2013	23.32375	22	24.84
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/7/2013	22.9025	22.01	24.31
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/8/2013	22.69542	21.72	24.02
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/9/2013	22.91917	21.96	24.24
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/10/2013	23.1075	22.2	24.36
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/11/2013	23.10625	22.2	24.4
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/12/2013	22.88042	21.91	24.21
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/13/2013	22.91167	21.89	24.26
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/14/2013	22.86917	21.96	24.17

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/15/2013	22.7925	22.01	24.02
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/16/2013	22.57208	21.81	23.73
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/17/2013	22.52792	21.79	23.56
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/18/2013	22.81792	21.89	24.07
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/19/2013	23.04792	22	24.41
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/20/2013	23.18083	22	24.96
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/21/2013	23.05125	22.15	24.36
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/22/2013	23.01167	22	23.83
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/23/2013	22.93875	22.34	23.85
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/24/2013	23.06333	22.1	24.31
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/25/2013	23.29833	22.32	24.65
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/26/2013	23.43667	22.41	24.91
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/27/2013	23.42583	22.46	24.94
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/28/2013	23.35542	22.39	24.7
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/29/2013	23.10833	22.1	24.21
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/30/2013	22.97708	22.03	24.36
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/31/2013	22.82792	21.93	24.09
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/1/2013	22.42667	21	23.68
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/2/2013	22.37583	21.41	23.54
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/3/2013	22.48542	21	23.66
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/4/2013	22.58167	21.91	23.59
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/5/2013	22.565	21.84	23.64
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/6/2013	22.54208	21.91	23.49
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/7/2013	22.53125	21.84	23.64
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/8/2013	22.6325	21.91	23.85
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/9/2013	22.48917	21.84	23.47
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/10/2013	22.62	21.93	23.59
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/11/2013	22.80667	22.1	23.85
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/12/2013	22.94792	22.17	24.09
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/13/2013	23.04542	22.2	24.07
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/14/2013	22.87208	22.1	23.85
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/15/2013	23.30583	22	24.33
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/16/2013	23.885	23	24.94
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/17/2013	23.51	23	24.02
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/18/2013	23.41625	22.58	24.33
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/19/2013	23.825	23.1	24.87
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/20/2013	23.8425	23	24.94
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/21/2013	23.55208	22.87	24.55
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/22/2013	23.03667	22	23.9
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/23/2013	22.89292	22.34	23.66
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/24/2013	22.70542	22	23.47
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/25/2013	23.42042	22.48	24.96
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/26/2013	23.40708	22.94	24.17
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/27/2013	22.97458	22.34	23.76
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/28/2013	23.07667	22.34	23.9
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/29/2013	23.49667	22.87	24.38
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/30/2013	23.69583	23	24.67
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/31/2013	23.725	23.08	24.58
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/1/2013	23.7175	23	24.55
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/2/2013	23.51417	23	23.97
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/3/2013	23.13583	22	23.88

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/4/2013	22.81708	22	23.56
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/5/2013	22.54792	22.01	23.32
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/6/2013	22.46625	21.67	23.47
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/7/2013	22.80583	22.03	23.83
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/8/2013	22.97958	22.17	24
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/9/2013	23.20208	22	24.24
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/10/2013	23.18333	22.51	23.9
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/11/2013	23.00792	22.56	23.56
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/12/2013	22.60083	22.17	23.37
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/13/2013	22.49042	21.98	23.3
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/14/2013	22.30125	21.81	23.01
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/15/2013	22.18333	21.62	22.9
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/16/2013	22.3775	21.81	23.3
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/17/2013	21.99	21.48	22.75
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/18/2013	21.82833	21.15	22.84
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/19/2013	21.49917	20.7	22.36
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/20/2013	21.36958	20.7	22.01
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/21/2013	21.34958	21.03	21.65
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/22/2013	20.87708	20.5	21.58
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/23/2013	20.78708	20.1	21.55
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/24/2013	20.96083	20.55	21.62
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/25/2013	20.41542	20.03	20.81
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/26/2013	19.82917	19.2	20.62
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/27/2013	19.76833	18.93	20.74
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/28/2013	19.77917	18.96	20.55
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/29/2013	20.08708	19.34	20.79
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/30/2013	20.565	19.9	21.29
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/1/2013	20.37292	19.84	20.88
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/2/2013	20.04542	19.53	20.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/3/2013	19.545	19.03	20.12
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/4/2013	19.30375	18.43	20.19
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/5/2013	19.25125	18.46	19.88
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/6/2013	19.23625	18.46	19.9
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/7/2013	19.265	18.5	19.93
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/8/2013	18.87792	18.3	19.43
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/9/2013	18.54625	18	18.96
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/10/2013	18.45458	17.89	19.05
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/11/2013	18.42	17.89	18.91
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/12/2013	18.15375	17.62	18.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/13/2013	18.09125	17.46	18.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/14/2013	18.06167	17.36	18.79
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/15/2013	18.17708	17.36	18.98
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/16/2013	18.25792	17.43	19.31
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/17/2013	18.11063	17.58	18.72
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/29/2016	18.70711	18.39	19.032
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	4/30/2016	18.46438	17.701	19.151
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/1/2016	18.91625	17.986	19.936
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/2/2016	19.15408	18.557	19.841
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/3/2016	19.16596	18.675	19.77
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/4/2016	19.20463	18.771	19.651
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/5/2016	19.05388	18.818	19.365

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/6/2016	18.45446	18.129	18.818
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/7/2016	18.05629	17.867	18.295
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/8/2016	18.294	17.629	19.08
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/9/2016	18.73	18.2	19.46
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/10/2016	19.04013	18.485	19.722
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/11/2016	19.16504	18.628	19.841
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/12/2016	19.39196	18.961	20.079
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/13/2016	19.17379	18.913	19.627
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/14/2016	19.11938	18.58	19.674
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/15/2016	19.40979	18.961	20.103
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/16/2016	19.65167	18.985	20.507
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/17/2016	19.89754	19.199	20.865
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/18/2016	19.96992	19.508	20.936
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/19/2016	20.07113	19.651	20.865
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/20/2016	19.57325	19.246	19.936
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/21/2016	19.19367	18.985	19.389
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/22/2016	18.97175	18.58	19.436
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/23/2016	18.86567	18.366	19.436
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/24/2016	18.97367	18.652	19.365
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/25/2016	19.11646	18.628	19.746
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/26/2016	19.369	18.771	20.031
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/27/2016	19.62192	19.008	20.412
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/28/2016	19.88263	19.341	20.579
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/29/2016	20.01058	19.413	20.746
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/30/2016	20.11171	19.579	20.722
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	5/31/2016	20.26546	19.698	20.984
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/1/2016	20.33496	19.936	21.032
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/2/2016	20.31696	19.912	20.77
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/3/2016	20.01233	19.793	20.388
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/4/2016	19.99263	19.746	20.579
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/5/2016	20.02738	19.77	20.365
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/6/2016	20.0035	19.77	20.269
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/7/2016	19.93504	19.817	20.15
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/8/2016	19.76058	19.674	19.888
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/9/2016	19.59892	19.555	19.674
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/10/2016	19.57329	19.484	19.674
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/11/2016	19.63767	19.508	19.77
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/12/2016	19.92421	19.627	20.388
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/13/2016	19.89738	19.627	20.269
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/14/2016	19.69029	19.579	19.841
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/15/2016	19.97788	19.698	20.46
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/16/2016	19.82388	19.674	20.198
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/17/2016	19.86558	19.746	20.079
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/18/2016	19.95275	19.793	20.15
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/19/2016	20.17413	19.912	20.412
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/20/2016	20.34279	20.055	20.698
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/21/2016	20.64854	20.222	21.151
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/22/2016	20.70404	20.412	21.079
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/23/2016	20.92946	20.507	21.461
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/24/2016	20.90571	20.484	21.437
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/25/2016	21.14025	20.65	21.772

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/26/2016	21.28438	20.841	21.748
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/27/2016	21.54988	21.008	22.13
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/28/2016	21.64029	21.318	22.034
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/29/2016	21.70121	21.223	22.298
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	6/30/2016	21.73683	21.223	22.13
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/1/2016	21.86438	21.39	22.369
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/2/2016	21.92296	21.485	22.298
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/3/2016	22.03071	21.533	22.609
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/4/2016	21.98179	21.509	22.417
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/5/2016	21.90204	21.581	22.321
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/6/2016	21.81246	21.485	22.25
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/7/2016	21.85933	21.485	22.178
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/8/2016	21.92904	21.557	22.298
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/9/2016	21.95588	21.652	22.274
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/10/2016	21.79358	21.437	22.226
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/11/2016	21.75971	21.437	22.082
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/12/2016	21.85329	21.533	22.154
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/13/2016	21.79658	21.557	22.178
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/14/2016	21.8125	21.676	22.011
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/15/2016	21.707	21.533	21.987
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/16/2016	21.85042	21.533	22.489
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/17/2016	21.63433	21.461	21.843
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/18/2016	21.55863	21.413	21.772
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/19/2016	21.79058	21.461	22.154
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/20/2016	21.685	21.437	21.939
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/21/2016	21.65417	21.461	21.867
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/22/2016	21.77567	21.509	22.034
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/23/2016	21.95583	21.724	22.178
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/24/2016	22.01763	21.7	22.25
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/25/2016	22.09038	21.819	22.298
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/26/2016	22.41842	22.178	22.681
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/27/2016	22.92638	22.393	23.448
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/28/2016	22.95654	22.489	23.545
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/29/2016	22.89675	22.345	23.569
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/30/2016	22.85354	22.226	23.472
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	7/31/2016	23.20517	22.8	23.617
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/1/2016	22.65871	22.321	22.968
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/2/2016	22.19492	21.724	22.537
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/3/2016	22.21588	21.724	22.657
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/4/2016	22.27883	21.867	22.848
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/5/2016	22.17504	21.748	22.8
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/6/2016	22.33458	21.963	22.824
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/7/2016	22.17613	21.748	22.561
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/8/2016	22.10025	21.676	22.489
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/9/2016	22.17017	21.748	22.633
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/10/2016	22.28971	21.819	22.705
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/11/2016	22.33163	21.867	22.705
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/12/2016	22.35154	21.939	22.657
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/13/2016	22.55692	22.154	22.968
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/14/2016	22.71758	22.393	23.112
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/15/2016	22.48117	22.226	22.729

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/16/2016	22.57479	22.321	22.896
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/17/2016	22.68967	22.298	23.256
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/18/2016	22.67071	22.393	23.016
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/19/2016	22.516	22.321	22.729
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/20/2016	22.57288	22.345	22.848
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/21/2016	22.57783	22.369	22.824
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/22/2016	22.517	22.345	22.681
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/23/2016	22.533	22.369	22.657
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/24/2016	22.525	22.393	22.633
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/25/2016	22.57	22.417	22.705
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/26/2016	22.61492	22.393	22.776
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/27/2016	22.67671	22.489	22.872
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/28/2016	22.63175	22.393	22.848
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/29/2016	22.62771	22.417	22.848
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/30/2016	22.6805	22.321	22.944
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	8/31/2016	22.75846	22.489	22.944
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/1/2016	22.7685	22.393	23.064
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/2/2016	22.74446	22.393	23.064
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/3/2016	22.71758	22.417	23.088
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/4/2016	22.58688	22.226	22.992
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/5/2016	22.46725	21.963	22.968
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/6/2016	22.52308	22.058	22.968
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/7/2016	22.62188	22.106	23.088
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/8/2016	22.72258	22.226	23.184
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/9/2016	22.83846	22.561	23.208
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/10/2016	22.85642	22.561	23.136
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/11/2016	22.90329	22.681	23.16
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/12/2016	22.85725	22.537	23.112
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/13/2016	22.63688	22.465	22.8
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/14/2016	22.66667	22.393	22.944
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/15/2016	22.72263	22.441	22.992
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/16/2016	22.67963	22.369	22.968
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/17/2016	22.6965	22.345	23.088
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/18/2016	22.89729	22.633	23.184
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/19/2016	23.004	22.776	23.256
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/20/2016	23.026	22.8	23.256
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/21/2016	22.923	22.776	23.088
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/22/2016	22.66775	22.465	22.896
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/23/2016	22.56183	22.321	22.848
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/24/2016	22.62575	22.393	22.92
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/25/2016	22.66863	22.202	23.04
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/26/2016	22.65079	22.25	23.112
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/27/2016	22.71954	22.417	23.088
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/28/2016	22.45217	22.011	22.968
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/29/2016	22.43925	22.13	22.824
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	9/30/2016	22.37333	22.178	22.585
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/1/2016	22.08025	21.819	22.345
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/2/2016	21.31708	20.793	22.058
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/3/2016	21.25929	21.127	21.437
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/4/2016	21.49517	21.103	22.011
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/5/2016	21.63429	21.294	21.963

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/6/2016	21.64629	21.199	22.034
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/7/2016	21.70804	21.342	22.011
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/8/2016	21.67617	21.294	22.034
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/9/2016	21.71583	21.27	22.13
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/10/2016	21.0805	20.698	21.533
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/11/2016	20.93158	20.436	21.557
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/12/2016	21.27133	21.008	21.557
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/13/2016	21.13521	20.841	21.461
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/14/2016	21.01779	20.865	21.127
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/15/2016	21.27529	20.936	21.724
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/16/2016	20.69238	19.722	21.39
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/17/2016	19.59508	19.27	20.174
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/18/2016	19.33342	18.818	19.912
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/19/2016	19.30263	18.723	19.865
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/20/2016	19.40383	18.818	19.936
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/21/2016	19.65954	19.08	20.198
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/22/2016	19.81017	19.341	20.246
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/23/2016	19.6575	19.246	20.055
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/24/2016	19.62967	19.389	19.936
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/25/2016	19.42354	19.127	19.651
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/26/2016	19.33842	18.842	19.817
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/27/2016	19.42358	19.222	19.627
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/28/2016	18.87463	18.129	19.365
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/29/2016	19.32854	18.937	19.912
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/30/2016	19.02713	18.771	19.341
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	10/31/2016	18.63983	18.224	19.08
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/1/2016	18.62	18.319	18.866
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/2/2016	18.38613	17.891	18.794
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/3/2016	18.46838	17.986	18.842
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/4/2016	18.46938	18.081	18.866
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/5/2016	18.31375	17.867	18.652
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/6/2016	18.49508	18.152	18.889
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/7/2016	18.73092	18.438	19.032
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/8/2016	18.76363	18.319	19.103
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/9/2016	18.72692	18.319	19.056
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/10/2016	18.67346	18.295	19.008
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/11/2016	18.86875	18.224	19.413
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/12/2016	19.10554	18.723	19.436
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/13/2016	18.8695	18.414	19.222
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/14/2016	18.70321	18.509	18.985
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/15/2016	18.60213	18.366	18.889
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/16/2016	17.93529	17.463	18.604
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/17/2016	17.28421	16.915	17.51
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/18/2016	17.10475	16.606	17.51
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/19/2016	16.97079	16.796	17.177
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/20/2016	16.81029	16.487	17.13
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/21/2016	16.75663	16.344	17.225
30150	GUADALUPE RIVER	CREEK	30150-35	Downstream Alamitos Drop Structure	10160	WT	Water Temperature	C	0	30	11/22/2016	16.73011	16.558	16.939

Temperature Data from Alamitos Creek Inlet to Almaden Lake Station Number 30100-13 June 29, 2000 – December 4, 2008

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/29/2000	20.00332	18.388735	21.46985
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/30/2000	18.99771	17.578442	21.139731
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/1/2000	18.70968	16.93821	20.979673
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/2/2000	18.45459	16.618095	20.649553
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/3/2000	18.44667	16.778153	20.489496
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/4/2000	18.49461	16.778153	20.809611
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/5/2000	18.3854	17.098268	20.319434
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/6/2000	18.54087	16.778153	20.809611
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/7/2000	18.72177	17.258326	20.649553
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/8/2000	19.0323	17.418384	21.309792
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/9/2000	19.03147	17.7385	20.979673
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/10/2000	18.87516	17.7385	20.809611
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/11/2000	18.8539	17.898558	20.159376
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/12/2000	18.8068	17.898558	20.159376
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/13/2000	18.82723	17.898558	20.159376
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/14/2000	18.8068	17.7385	20.159376
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/15/2000	18.72636	17.898558	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/16/2000	18.53879	18.058616	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/17/2000	18.5713	18.058616	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/18/2000	18.81389	18.058616	19.999318
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/19/2000	18.69926	17.898558	19.669199
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/20/2000	18.82056	18.058616	19.999318
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/21/2000	18.69301	18.218674	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/22/2000	18.71302	18.218674	19.669199
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/23/2000	18.64508	18.058616	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/24/2000	18.72636	18.058616	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/25/2000	18.64591	18.058616	19.669199
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/26/2000	18.53212	18.058616	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/27/2000	18.49794	17.898558	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/28/2000	18.58631	18.058616	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/29/2000	18.7622	18.218674	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/30/2000	18.78221	18.388735	19.669199
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/31/2000	18.87516	18.218674	19.669199
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/1/2000	18.75553	18.388735	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/2/2000	18.83556	18.388735	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/3/2000	18.84265	18.388735	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/4/2000	18.74887	18.388735	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/5/2000	18.75553	18.388735	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/6/2000	18.7622	18.388735	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/7/2000	18.74887	18.388735	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/8/2000	18.75553	18.388735	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/9/2000	18.7622	18.388735	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/10/2000	18.7622	18.388735	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/11/2000	18.70177	18.218674	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/12/2000	18.74887	18.388735	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/13/2000	18.81556	18.388735	19.669199
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/14/2000	18.80847	18.218674	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/15/2000	18.80222	18.388735	19.669199
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/16/2000	18.79555	18.388735	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/17/2000	18.79555	18.388735	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/18/2000	18.7076	18.218674	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/19/2000	18.75553	18.388735	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/20/2000	18.65925	18.058616	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/21/2000	18.78221	18.388735	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/22/2000	18.72219	18.388735	19.189025

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/23/2000	18.75553	18.388735	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/24/2000	18.88933	18.548793	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/25/2000	18.8489	18.548793	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/26/2000	18.86224	18.708851	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/27/2000	18.86224	18.548793	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/28/2000	18.9827	18.708851	19.999318
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/29/2000	18.78221	18.708851	18.868909
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/30/2000	18.8489	18.708851	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/31/2000	18.88892	18.708851	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/1/2000	18.67551	18.548793	18.708851
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/2/2000	18.79555	18.548793	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/3/2000	18.65967	18.058616	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/4/2000	18.63924	17.898558	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/5/2000	18.54546	17.898558	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/6/2000	18.64591	18.058616	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/7/2000	18.75387	18.218674	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/8/2000	18.80889	18.388735	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/9/2000	18.82889	18.388735	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/10/2000	18.84223	18.548793	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/11/2000	18.85599	18.388735	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/12/2000	18.84223	18.548793	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/13/2000	19.03564	18.708851	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/14/2000	19.06898	19.028967	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/15/2000	19.09566	19.028967	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/16/2000	19.07565	18.708851	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/17/2000	19.10233	18.708851	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/18/2000	19.28989	18.868909	19.999318
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/19/2000	19.38285	19.189025	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/20/2000	19.47663	19.189025	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/21/2000	19.49705	19.189025	19.999318
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/22/2000	19.38243	19.189025	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/23/2000	19.38285	19.028967	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/24/2000	19.03522	18.218674	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/25/2000	19.19569	18.708851	19.669199
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/26/2000	19.42369	19.189025	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/27/2000	19.45621	19.189025	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/28/2000	19.34241	19.189025	19.669199
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/29/2000	19.28948	18.868909	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/30/2000	19.37701	19.028967	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/1/2000	19.43661	19.189025	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/2/2000	19.42369	19.189025	19.83926
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/3/2000	19.29573	19.028967	19.669199
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/4/2000	19.09566	18.708851	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/5/2000	19.11567	18.708851	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/6/2000	19.18236	18.868909	19.509141
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/7/2000	19.06898	18.708851	19.349083
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/8/2000	19.19569	19.028967	19.669199
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/9/2000	19.04231	18.868909	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/10/2000	18.64758	17.7385	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/11/2000	18.83556	18.548793	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/12/2000	18.84223	18.548793	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/13/2000	18.59339	18.058616	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/14/2000	18.42416	17.7385	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/15/2000	18.57547	18.388735	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/16/2000	18.33705	17.578442	19.028967

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/17/2000	18.49127	17.898558	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/18/2000	18.65383	17.898558	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/19/2000	18.89559	18.708851	19.189025
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/20/2000	18.63424	18.058616	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/21/2000	18.55338	18.218674	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/22/2000	18.14865	17.7385	18.868909
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/23/2000	18.03527	17.258326	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/24/2000	18.20992	17.578442	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/25/2000	18.33038	18.058616	18.708851
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/26/2000	18.10363	16.458037	18.708851
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/27/2000	18.62757	18.218674	19.028967
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/28/2000	17.97442	16.618095	18.708851
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/29/2000	17.94988	16.458037	18.708851
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/30/2000	17.75184	17.578442	17.898558
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/16/2001	19.09667	17.97	20.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/17/2001	19.08458	17.81	20.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/18/2001	19.27667	17.81	21.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/19/2001	19.3575	17.97	21.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/20/2001	19.40333	18.29	21.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/21/2001	19.235	17.81	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/22/2001	19.385	17.81	21.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/23/2001	19.805	18.46	21.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/24/2001	19.58458	17.48	22.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/25/2001	19.11042	16.84	21.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/26/2001	18.93292	16.84	21.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/27/2001	18.72208	16.84	21.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/28/2001	18.5475	16.52	21.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/29/2001	18.42667	16.37	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/30/2001	17.55	16.05	19.27
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/31/2001	18.14708	15.73	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/1/2001	18.42625	16.37	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/2/2001	18.31167	16.37	20.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/3/2001	18.36958	16.68	20.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/4/2001	18.68	17.16	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/5/2001	18.52	16.52	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/6/2001	18.82417	17	21.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/7/2001	19.11375	17.32	21.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/8/2001	19.26417	17.32	21.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/9/2001	18.89667	17	21.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/10/2001	18.57833	17	20.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/11/2001	18.51167	16.84	20.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/12/2001	18.38167	16.84	20.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/13/2001	18.38917	16.84	20.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/14/2001	18.64583	17	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/15/2001	18.86208	17.32	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/16/2001	19.02458	17.32	21.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/17/2001	19.01833	17.32	21.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/18/2001	18.80292	16.84	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/19/2001	18.69375	16.68	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/20/2001	18.45625	16.84	20.4
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/21/2001	18.255	16.52	20.4
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/22/2001	18.47	17.32	20.4
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/23/2001	18.94958	17.32	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/24/2001	19.43167	18.13	21.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/25/2001	18.86333	17	21.06

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/26/2001	18.95792	17.16	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/27/2001	19.18	17.32	21.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/28/2001	19.19375	17.32	21.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/29/2001	19.00375	17.64	20.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/30/2001	18.73958	17.48	20.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/31/2001	18.88292	17	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/1/2001	19.24167	17.48	21.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/2/2001	19.3975	17.64	21.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/3/2001	19.465	17.97	21.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/4/2001	19.43125	17.81	21.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/5/2001	19.22875	17.81	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/6/2001	18.66583	17	20.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/7/2001	18.92958	17.16	20.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/8/2001	18.84833	17.32	20.4
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/9/2001	18.74	17.32	20.4
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/10/2001	18.8875	17.48	20.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/11/2001	19.16667	17.97	20.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/12/2001	18.92292	17.64	20.4
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/13/2001	19.45125	18.46	20.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/14/2001	19.51875	18.29	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/15/2001	19.47792	18.62	20.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/16/2001	19.32208	18.46	20.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/17/2001	19.37625	18.29	20.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/18/2001	19.36875	18.29	20.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/19/2001	19.30125	18.13	20.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/20/2001	19.24	18.13	20.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/21/2001	19.55833	18.62	20.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/22/2001	19.1725	17.97	20.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/23/2001	19.05833	18.13	20.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/24/2001	19.215	18.46	20.24
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/25/2001	19.45	18.29	20.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/26/2001	19.18583	17.81	20.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/27/2001	19.2875	18.13	20.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/28/2001	18.14625	16.84	19.59
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/29/2001	18.36292	16.84	19.92
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/30/2001	18.95583	17.32	20.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/1/2001	19.79667	18.62	21.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/2/2001	19.67292	18.78	20.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/3/2001	19.38208	18.29	20.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/4/2001	19.1125	18.29	20.24
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/5/2001	18.89	18.29	19.92
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/6/2001	18.58417	17.97	19.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/7/2001	18.19333	17	19.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/8/2001	18.70625	17.97	19.76
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/9/2001	18.01125	16.84	19.27
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/10/2001	17.71042	16.21	18.94
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/11/2001	18.065	16.84	19.11
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/12/2001	18.03792	16.84	19.11
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/13/2001	18.22083	16.84	19.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/14/2001	18.39667	17	19.76
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/15/2001	18.6125	17.32	19.92
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/16/2001	18.32708	17.48	19.11
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/17/2001	18.36833	17.64	19.27
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/18/2001	18.16625	17	19.27
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/19/2001	17.795	16.68	18.62

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/20/2001	17.82875	16.68	18.78
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/21/2001	17.69167	17.16	18.29
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/22/2001	17.39833	16.37	18.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/23/2001	17.54542	16.68	18.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/24/2001	16.9175	15.73	17.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/25/2001	16.12857	15.26	17.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/15/2004	21.12	19.52	22.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/16/2004	19.70583	17.58	22.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/17/2004	19.35292	17.26	21.97
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/18/2004	19.23	17.42	21.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/19/2004	19.37708	17.74	21.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/20/2004	19.31083	17.74	21.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/21/2004	19.18875	17.42	21.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/22/2004	19.00083	17.26	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/23/2004	18.705	16.62	21.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/24/2004	18.77917	16.78	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/25/2004	18.84042	16.62	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/26/2004	19.20417	17.26	21.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/27/2004	19.21167	16.94	21.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/28/2004	19.46	17.42	21.97
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/29/2004	19.34417	17.42	21.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/30/2004	19.33833	17.42	21.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/1/2004	19.34208	17.9	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/2/2004	19.325	17.42	21.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/3/2004	19.53417	17.74	22.14
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/4/2004	19.75875	17.74	22.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/5/2004	19.94708	18.06	22.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/6/2004	20.04208	18.22	22.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/7/2004	19.85167	18.06	22.14
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/8/2004	19.46667	17.58	21.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/9/2004	18.25958	16.62	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/10/2004	18.69125	16.62	20.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/11/2004	18.13625	15.84	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/12/2004	17.98167	15.84	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/13/2004	18.10042	16.47	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/14/2004	17.3825	15.52	19.52
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/15/2004	17.18375	14.89	19.52
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/16/2004	17.10875	15.21	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/17/2004	17.18875	15.21	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/18/2004	17.57583	15.68	19.68
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/19/2004	17.94833	15.99	20.16
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/20/2004	17.92917	15.84	20.16
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/21/2004	18.25667	15.99	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/22/2004	18.7575	16.78	20.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/23/2004	18.83667	17.1	20.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/24/2004	19.06542	17.42	21.14
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/25/2004	19.46542	17.74	21.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/26/2004	19.19542	17.26	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/27/2004	18.79667	16.94	20.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/28/2004	18.40792	16.47	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/29/2004	18.20833	16.15	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/30/2004	18.33417	16.47	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/31/2004	18.30625	16.62	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/1/2004	18.34625	16.78	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/2/2004	17.93083	16.62	19.52

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/3/2004	18.1025	16.31	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/4/2004	18.71542	17.1	20.65
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/5/2004	18.21375	16.47	20.16
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/6/2004	18.10208	15.99	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/7/2004	18.99958	16.94	21.14
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/8/2004	19.35708	17.42	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/9/2004	19.37542	17.9	21.14
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/10/2004	19.50458	17.9	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/11/2004	19.49083	17.9	21.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/12/2004	19.61917	18.06	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/13/2004	19.53833	17.9	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/14/2004	19.46917	18.22	21.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/15/2004	19.30833	17.74	21.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/16/2004	19.38333	17.58	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/17/2004	19.83	18.06	21.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/18/2004	20.06792	18.38	22.14
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/19/2004	19.78083	18.38	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/20/2004	19.73375	18.06	21.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/21/2004	20.01792	18.87	21.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/22/2004	19.57	18.54	20.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/23/2004	19.97792	18.87	21.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/24/2004	19.755	18.71	21.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/25/2004	19.27375	17.74	20.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/26/2004	19.4025	17.9	20.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/27/2004	19.18667	17.26	21.14
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/28/2004	19.47208	17.42	21.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/29/2004	19.56458	17.9	21.14
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/30/2004	19.73333	18.22	21.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/31/2004	19.95	18.38	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/1/2004	21.02	20.48	21.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/2/2004	20.7575	20.32	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/3/2004	20.40708	19.68	21.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/4/2004	20.50375	19.68	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/5/2004	20.93292	20	21.97
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/6/2004	21.095	20.32	21.97
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/7/2004	21.1025	20.32	22.14
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/8/2004	21.13	20.32	22.14
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/9/2004	21.15083	20.32	22.14
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/10/2004	20.88917	20.16	21.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/11/2004	20.82792	20.16	21.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/12/2004	20.90917	20.32	21.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/13/2004	20.67667	20	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/14/2004	20.56167	19.84	21.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/15/2004	20.67833	20	21.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/16/2004	20.95833	20.32	21.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/17/2004	20.82708	20.32	21.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/18/2004	20.30667	19.84	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/19/2004	19.8	19.52	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/20/2004	19.2875	17.9	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/21/2004	19.62333	18.87	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/22/2004	19.81875	19.03	20.65
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/23/2004	20.06917	19.36	20.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/24/2004	20.13	19.52	20.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/25/2004	20.15625	19.68	20.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/26/2004	19.91333	19.19	20.65

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/27/2004	19.84042	19.36	20.65
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/28/2004	20.0075	19.68	20.65
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/29/2004	19.62667	19.36	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/30/2004	19.28	19.03	20
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/1/2004	19.16667	18.71	20
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/2/2004	19.085	18.54	19.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/3/2004	19.05167	18.54	19.68
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/4/2004	19.18667	18.71	19.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/5/2004	19.28042	18.87	19.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/6/2004	19.02583	18.71	19.68
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/7/2004	18.76708	18.06	19.68
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/8/2004	18.94958	18.54	19.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/9/2004	18.95083	18.54	19.68
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/10/2004	18.69958	18.06	19.52
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/11/2004	18.35	17.58	19.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/12/2004	18.41833	17.58	19.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/13/2004	18.465	17.74	19.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/14/2004	18.56542	17.74	19.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/15/2004	18.74792	18.06	19.52
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/16/2004	18.76	18.22	19.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/17/2004	18.94917	18.54	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/18/2004	18.75875	18.38	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/19/2004	16.49542	13.95	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/20/2004	16.84417	15.84	17.9
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/21/2004	16.94333	15.99	18.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/22/2004	16.88583	15.84	18.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/23/2004	16.78375	16.15	17.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/24/2004	17.33333	16.94	18.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/25/2004	16.93	16.31	17.9
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/26/2004	15.01583	12.41	16.78
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/27/2004	15.79625	15.04	16.62
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/28/2004	15.76917	14.89	16.78
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/29/2004	16.31083	15.52	17.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/30/2004	16.36875	15.36	17.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/31/2004	17.18	16.62	18.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/1/2004	16.36292	15.68	17.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/2/2004	16.15875	15.21	17.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/3/2004	16.24875	15.84	16.94
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/4/2004	15.42083	15.04	15.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/5/2004	15.60458	14.73	16.78
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/6/2004	15.60417	14.73	16.62
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/7/2004	16.09875	15.52	17.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/8/2004	16.15833	15.84	16.62
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/9/2004	16.08625	15.84	16.62
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/10/2004	16.0875	15.68	16.62
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/11/2004	15.63917	14.73	16.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/12/2004	15.7175	15.04	16.62
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/13/2004	15.7575	15.36	16.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/14/2004	15.45417	14.57	16.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/15/2004	15.6125	14.89	16.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/16/2004	15.54	14.73	16.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/17/2004	15.43458	14.57	16.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/18/2004	15.26875	14.57	16.15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/19/2004	15.24958	14.73	16.15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/20/2004	14.40542	13.79	15.36

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/21/2004	13.79625	13.18	14.57
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/22/2004	13.61708	12.72	14.57
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/23/2004	13.65625	12.87	14.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/24/2004	13.82542	12.87	14.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/25/2004	14.47708	13.79	15.21
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/26/2004	15.4725	14.89	16.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/27/2004	15.115	14.42	15.68
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/28/2004	13.585	12.87	14.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/29/2004	12.87583	12.09	13.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/30/2004	12.2525	11.33	13.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/1/2004	12.24458	11.48	13.18
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/2/2004	12.03958	11.33	13.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/3/2004	11.37042	10.4	12.25
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/4/2004	11.35	10.24	12.25
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/5/2004	12.24625	11.63	13.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/6/2004	12.54875	11.63	13.33
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/7/2004	12.04	10.24	13.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/8/2004	14.12	13.18	14.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/9/2004	15.04083	14.26	15.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/10/2004	14.80917	14.42	15.52
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/11/2004	14.16458	13.64	14.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/12/2004	13.77833	13.03	14.57
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/13/2004	14.27083	13.33	15.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/14/2004	14.63958	14.42	14.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/15/2004	14.14583	13.33	15.04
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/16/2004	13.32708	12.56	14.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/17/2004	12.95917	12.09	13.95
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/18/2004	12.79208	11.94	13.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/19/2004	12.78583	11.94	13.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/20/2004	12.81333	12.25	13.33
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/21/2004	12.91	12.25	13.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/22/2004	13.07667	12.56	13.95
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/23/2004	12.67042	11.94	13.49
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/24/2004	12.29042	11.48	13.18
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/25/2004	12.2325	11.48	13.18
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/26/2004	13.03333	12.56	13.49
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/27/2004	11.855	10.87	12.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/28/2004	11.43458	10.09	12.41
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/29/2004	12.61833	9.77	13.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/30/2004	10.81542	9.31	12.25
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/31/2004	11.14917	10.56	11.94
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/1/2005	10.57208	9.77	11.33
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/2/2005	11.19833	10.24	11.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/3/2005	11.08125	10.4	12.09
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/4/2005	11.65208	11.17	12.25
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/5/2005	12.04833	11.33	13.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/6/2005	12.29042	11.63	13.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/7/2005	11.40917	9.93	12.41
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/8/2005	11.01792	10.09	11.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/9/2005	11.77042	11.17	12.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/10/2005	12.09542	10.24	13.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/11/2005	10.24375	9.16	10.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/12/2005	10.15708	9.46	11.17
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/13/2005	10.0875	9.62	10.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/14/2005	9.97208	9.16	10.87

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/15/2005	10.03583	9	11.33
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/16/2005	10.4925	9.62	11.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/17/2005	10.64042	9.62	12.09
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/18/2005	10.87458	10.09	12.25
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/19/2005	10.37125	9.62	11.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/20/2005	10.56875	9.31	12.25
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/21/2005	10.75708	9.46	12.41
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/22/2005	10.67	9.93	11.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/23/2005	11.25708	10.56	12.41
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/24/2005	11.25913	10.09	12.72
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/25/2005	12.11208	10.87	13.33
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/26/2005	12.63833	11.94	13.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/27/2005	11.93083	11.02	13.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/28/2005	11.76333	11.02	13.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/29/2005	11.43833	10.56	12.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/30/2005	10.76333	9.31	12.56
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/31/2005	10.96917	9.31	12.72
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/1/2005	11.70042	10.09	13.49
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/2/2005	11.99542	10.4	13.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/3/2005	12.17583	10.56	13.95
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/4/2005	12.43375	10.71	14.11
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/5/2005	12.99208	11.94	14.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/6/2005	13.12042	12.09	14.57
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/7/2005	12.87833	12.41	13.49
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/8/2005	12.73292	12.09	13.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/9/2005	12.36125	11.17	13.95
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/10/2005	12.00875	9.93	14.11
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/11/2005	12.90167	12.09	13.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/12/2005	13.79708	12.41	15.68
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/13/2005	13.21083	12.41	13.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/14/2005	13.56542	13.03	14.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/15/2005	12.52875	11.48	13.49
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/16/2005	13.31458	12.09	14.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/17/2005	13.41625	13.03	13.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/18/2005	13.65167	12.41	15.04
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/19/2005	13.36625	12.56	14.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/20/2005	12.94667	12.25	13.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/21/2005	12.515	11.63	13.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/22/2005	12.25292	10.71	13.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/23/2005	13.03042	11.79	14.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/24/2005	13.30083	12.87	13.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/25/2005	13.06458	11.48	14.57
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/26/2005	12.18708	11.48	13.18
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/27/2005	12.71417	11.94	14.11
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/28/2005	12.65	11.48	14.57
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/1/2005	12.43875	11.33	14.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/2/2005	12.70208	11.63	14.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/3/2005	12.74083	11.17	14.57
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/4/2005	12.79458	12.41	13.33
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/5/2005	13.08542	11.79	15.21
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/6/2005	13.10875	11.48	15.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/7/2005	13.525	12.25	15.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/8/2005	14.00875	12.41	16.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/9/2005	14.83792	13.18	17.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/10/2005	15.22292	13.18	17.42

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/11/2005	15.42875	13.18	17.9
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/12/2005	14.96792	14.26	15.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/13/2005	15.39542	14.26	17.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/14/2005	14.78833	13.33	16.78
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/15/2005	13.96125	11.79	16.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/16/2005	14.01208	12.09	16.15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/17/2005	14.175	13.03	15.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/18/2005	13.94542	13.33	14.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/19/2005	14.39667	13.49	15.99
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/20/2005	14.33208	13.18	15.99
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/21/2005	13.90917	12.72	15.04
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/22/2005	13.13542	12.72	14.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/23/2005	12.94792	12.25	14.11
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/24/2005	12.57875	11.79	13.95
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/25/2005	12.35542	11.33	14.11
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/26/2005	12.70333	11.33	14.57
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/27/2005	13.40708	11.94	15.21
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/28/2005	13.92833	12.72	15.21
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/29/2005	13.6925	12.56	15.52
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/30/2005	13.84625	11.63	16.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/31/2005	14.41917	11.94	17.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/1/2005	14.92208	12.09	17.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/2/2005	14.43875	13.03	16.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/3/2005	14.1275	12.56	16.15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/4/2005	14.68333	12.87	17.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/5/2005	14.82375	12.41	17.58
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/6/2005	15.37167	13.03	18.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/7/2005	14.83292	13.95	16.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/8/2005	13.515	12.25	15.04
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/9/2005	14.52125	12.72	17.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/10/2005	14.98042	12.72	17.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/11/2005	15.01625	13.03	17.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/12/2005	14.70417	12.41	17.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/13/2005	14.36333	12.41	16.78
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/14/2005	14.14625	11.79	16.94
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/15/2005	14.69542	12.09	17.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/16/2005	15.64792	13.33	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/17/2005	16.435	14.73	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/18/2005	15.0625	12.87	17.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/19/2005	15.00083	12.56	17.9
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/20/2005	15.10458	12.41	18.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/21/2005	16.14042	14.11	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/22/2005	15.57417	13.79	17.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/23/2005	15.10792	14.11	16.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/24/2005	14.5125	13.49	15.52
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/25/2005	15.43417	13.03	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/26/2005	15.94083	13.79	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/27/2005	15.58708	14.26	16.78
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/28/2005	15.90958	14.42	17.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/29/2005	16.0425	13.64	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/30/2005	15.76458	14.11	17.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/1/2005	16.47542	14.42	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/2/2005	16.69083	14.26	19.52
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/3/2005	16.53208	14.42	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/4/2005	16.57375	15.52	17.42

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/5/2005	16.94583	15.84	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/6/2005	16.79542	15.36	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/7/2005	16.5675	14.57	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/8/2005	15.85542	15.36	16.78
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/9/2005	15.78333	14.73	17.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/10/2005	15.59708	13.03	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/11/2005	16.29667	13.64	19.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/12/2005	17.01167	14.26	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/13/2005	17.74708	15.52	20.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/14/2005	17.9625	15.36	21.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/15/2005	18.75208	16.94	21.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/16/2005	18.03625	17.1	19.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/17/2005	15.96042	14.57	17.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/18/2005	16.25083	15.21	17.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/19/2005	17.39917	16.15	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/20/2005	17.47083	15.36	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/21/2005	17.38875	14.89	20.65
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/22/2005	17.80792	15.36	20.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/23/2005	17.695	15.04	20.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/24/2005	17.55208	14.89	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/25/2005	17.55958	15.04	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/26/2005	17.085	15.21	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/27/2005	17.03708	15.84	18.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/28/2005	16.95417	16.47	17.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/29/2005	17.05542	16.47	17.9
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/30/2005	17.38792	16.47	18.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/31/2005	17.78833	16.78	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/1/2005	17.95583	17.1	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/2/2005	17.80083	16.78	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/3/2005	17.66667	16.78	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/4/2005	17.60667	16.78	18.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/5/2005	17.3075	16.47	18.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/6/2005	17.02917	16.15	17.9
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/7/2005	17.11583	16.31	17.9
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/8/2005	17.04	16.62	17.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/9/2005	17.46667	17.1	17.9
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/10/2005	17.82208	17.1	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/11/2005	17.98875	17.1	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/12/2005	17.84208	16.94	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/13/2005	18.13	17.26	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/14/2005	18.17625	17.42	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/15/2005	17.81333	16.94	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/16/2005	17.24667	16.94	18.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/17/2005	17.26	16.78	18.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/18/2005	17.34667	16.94	17.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/19/2005	17.48667	16.94	18.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/20/2005	17.74667	17.1	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/21/2005	17.8	17.1	18.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/22/2005	17.77333	17.1	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/23/2005	17.93458	17.26	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/24/2005	18.05417	17.42	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/25/2005	18.05333	17.58	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/26/2005	18.12792	17.58	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/27/2005	18.06	17.58	18.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/28/2005	18.18208	17.74	18.71

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/29/2005	18.33667	17.74	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/30/2005	18.49042	17.9	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/1/2005	18.54458	18.06	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/2/2005	18.51125	17.9	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/3/2005	18.35	17.74	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/4/2005	18.27583	17.74	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/5/2005	18.21458	17.74	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/6/2005	18.155	17.58	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/7/2005	18.26208	17.74	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/8/2005	18.20792	17.74	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/9/2005	18.41667	18.06	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/10/2005	18.36292	17.9	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/11/2005	18.55708	18.06	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/12/2005	18.63833	18.06	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/13/2005	18.81458	18.22	19.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/14/2005	18.79333	18.38	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/15/2005	18.77958	18.22	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/16/2005	18.83458	18.38	19.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/17/2005	18.95708	18.38	19.52
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/18/2005	18.91583	18.38	19.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/19/2005	18.79958	18.38	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/20/2005	18.79292	18.38	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/21/2005	18.58958	18.38	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/22/2005	18.42333	18.06	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/23/2005	18.55792	18.06	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/24/2005	18.78667	18.38	19.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/25/2005	18.79333	18.38	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/26/2005	18.65208	18.22	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/27/2005	18.59208	18.22	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/28/2005	18.56417	18.22	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/29/2005	18.5575	18.22	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/30/2005	18.56417	18.22	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/31/2005	18.60458	18.22	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/1/2005	18.61167	18.22	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/2/2005	18.54458	18.22	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/3/2005	18.52375	18.22	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/4/2005	18.51042	18.22	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/5/2005	18.54333	18.22	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/6/2005	18.52958	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/7/2005	18.53	18.38	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/8/2005	18.54333	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/9/2005	18.50208	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/10/2005	18.49625	18.22	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/11/2005	18.4825	18.22	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/12/2005	18.47583	18.22	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/13/2005	18.43333	18.22	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/14/2005	18.38667	18.22	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/15/2005	18.33333	18.22	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/16/2005	18.42833	18.22	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/17/2005	18.50875	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/18/2005	18.42	18.22	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/19/2005	18.48208	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/20/2005	18.46708	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/21/2005	18.45333	18.38	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/22/2005	18.43333	18.22	18.54

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/23/2005	18.48875	18.22	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/24/2005	18.44	18.22	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/25/2005	18.44	18.22	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/26/2005	18.44	18.22	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/27/2005	18.50875	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/28/2005	18.52208	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/29/2005	18.48042	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/30/2005	18.46	18.38	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/31/2005	18.46	18.38	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/1/2005	18.50083	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/2/2005	18.53542	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/3/2005	18.48042	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/4/2005	18.46667	18.38	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/5/2005	18.45333	18.38	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/6/2005	18.46667	18.38	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/7/2005	18.46	18.38	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/8/2005	18.51542	18.38	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/9/2005	18.65917	18.38	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/10/2005	18.465	17.42	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/11/2005	18.01708	16.78	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/12/2005	17.77167	16.31	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/13/2005	18.19167	17.1	19.68
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/14/2005	18.39958	17.26	20
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/15/2005	18.60042	17.42	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/16/2005	18.60042	17.42	20.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/17/2005	18.52042	17.26	20.16
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/18/2005	18.14625	16.62	19.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/19/2005	18.45417	16.78	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/20/2005	18.36458	17.26	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/21/2005	18.84292	17.58	20.65
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/22/2005	18.65458	17.42	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/23/2005	18.34583	17.26	19.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/24/2005	17.55875	15.99	19.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/25/2005	17.33333	15.84	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/26/2005	18.11917	16.78	19.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/27/2005	18.6275	17.58	20.16
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/28/2005	18.58833	16.94	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/29/2005	18.7025	16.94	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/30/2005	18.74208	17.1	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/1/2005	18.89625	17.58	20.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/2/2005	18.26458	17.1	19.52
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/3/2005	17.14958	15.99	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/4/2005	16.74167	15.52	18.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/5/2005	16.63625	15.04	18.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/6/2005	17.00208	15.52	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/7/2005	17.35708	16.15	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/8/2005	16.75917	15.52	18.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/9/2005	16.43167	14.89	18.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/10/2005	16.86125	15.36	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/11/2005	17.06542	15.68	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/12/2005	16.78167	15.36	18.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/13/2005	17.15375	15.68	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/14/2005	17.45833	15.99	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/15/2005	17.88	17.42	18.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/16/2005	17.49333	17.1	17.9

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/17/2005	17.62667	17.42	17.9
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/18/2005	17.82667	17.74	18.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/19/2005	18.24	18.06	18.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/20/2005	18.42667	18.38	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/21/2005	18.48	18.38	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/22/2005	18.55417	18.54	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/23/2005	18.6675	18.54	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/24/2005	18.65333	18.54	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/25/2005	18.73	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/26/2005	18.73	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/27/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/28/2005	18.74333	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/29/2005	18.87	18.87	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/30/2005	18.77667	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/31/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/1/2005	18.72333	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/2/2005	18.87	18.87	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/3/2005	18.75	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/4/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/5/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/6/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/7/2005	18.72333	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/8/2005	18.87	18.87	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/9/2005	18.83667	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/10/2005	18.74333	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/11/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/12/2005	18.73667	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/13/2005	18.74333	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/14/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/15/2005	18.73667	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/16/2005	18.73	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/17/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/18/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/19/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/20/2005	18.68167	18.54	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/21/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/22/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/23/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/24/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/25/2005	18.73667	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/26/2005	18.73667	18.71	18.87
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/27/2005	18.71	18.71	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/28/2005	18.69583	18.54	18.71
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/29/2005	18.4	18.38	18.54
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/30/2005	18.08667	17.74	18.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/1/2005	16.19167	14.57	17.58
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/2/2005	13.28917	12.87	14.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/3/2005	13.28833	12.56	13.95
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/4/2005	12.81208	12.09	13.49
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/5/2005	12.58042	11.94	13.33
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/6/2005	12.39417	11.63	13.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/7/2005	12.58542	12.09	13.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/8/2005	14.16458	13.64	14.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/9/2005	14.11458	13.49	14.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/10/2005	13.5975	13.03	14.26

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/11/2005	13.78333	13.33	14.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/12/2005	14.01583	13.49	14.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/13/2005	14.315	14.11	14.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/14/2005	13.405	12.56	14.57
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/15/2005	12.97375	12.41	13.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/16/2005	12.58083	11.94	13.33
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/17/2005	12.90875	12.41	13.95
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/18/2005	12.45958	10.71	14.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/19/2005	13.7775	13.49	14.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/20/2005	14.27583	13.79	15.21
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/21/2005	14.98176	14.89	15.21
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/25/2007	18.02154	16.79	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/26/2007	17.41417	16.27	19.5
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/27/2007	17.44	16.39	19.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/28/2007	17.25833	15.81	19.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/29/2007	17.36667	16.15	19.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/30/2007	17.3075	16.36	19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/31/2007	17.10417	15.96	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/1/2007	15.48708	13.95	17.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/2/2007	15.06292	13.64	16.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/3/2007	15.00375	13.37	17.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/4/2007	15.50458	14.09	17.17
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/5/2007	15.50625	14.52	16.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/6/2007	14.71625	13.23	16.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/7/2007	14.8775	13.32	16.63
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/8/2007	15.08125	13.66	16.53
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/9/2007	15.6725	14.26	17.01
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/10/2007	16.21667	15.05	17.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/11/2007	16.13167	14.76	17.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/12/2007	16.3575	14.93	17.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/13/2007	16.77542	15.43	18.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/14/2007	17.17875	15.86	18.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/15/2007	17.2075	15.98	18.27
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/16/2007	17.00542	15.89	18.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/17/2007	16.82292	15.53	18.01
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/18/2007	17.215	15.81	18.69
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/19/2007	17.13833	15.89	18.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/20/2007	17.02583	15.86	18.2
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/21/2007	17.225	16.1	18.5
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/22/2007	17.12708	15.91	18.29
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/23/2007	17.09417	15.91	18.2
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/24/2007	16.97917	15.86	18.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/25/2007	17.16667	16.01	18.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/26/2007	17.3225	16.2	18.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/27/2007	17.42417	16.39	18.53
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/28/2007	17.56667	16.51	18.65
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/29/2007	18.00375	17.29	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/30/2007	17.63833	16.72	18.53
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/1/2007	17.6	16.89	18.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/2/2007	17.80042	17.1	18.6
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/3/2007	18.09458	17.55	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/4/2007	18.19708	17.62	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/5/2007	18.43625	17.89	19.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/6/2007	18.34208	17.84	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/7/2007	18.17625	17.74	18.67

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/8/2007	18.13333	17.65	18.69
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/9/2007	18.27333	17.84	18.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/10/2007	18.15083	17.89	18.41
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/11/2007	18.29458	17.91	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/12/2007	18.35917	17.93	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/13/2007	18.3825	17.86	18.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/14/2007	18.50292	18.1	19.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/15/2007	18.53125	18.08	19.15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/16/2007	18.4325	18.1	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/17/2007	18.34667	17.93	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/18/2007	18.315	18.22	18.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/19/2007	18.31333	17.89	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/20/2007	18.35375	17.93	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/21/2007	18.56417	18.15	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/22/2007	18.73042	18.31	19.29
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/23/2007	18.79583	18.34	19.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/24/2007	18.91792	18.48	19.5
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/25/2007	18.68083	18.27	19.12
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/26/2007	18.56083	18.17	19.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/27/2007	18.49583	18.1	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/28/2007	18.4475	18.01	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/29/2007	18.44	17.96	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/30/2007	18.48	18.05	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/31/2007	18.49458	18.1	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/1/2007	18.47583	18.1	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/2/2007	18.54917	18.24	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/3/2007	18.5925	18.29	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/4/2007	18.59958	18.29	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/5/2007	18.45875	18.22	18.67
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/6/2007	18.40958	18.22	18.62
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/7/2007	18.35292	18.1	18.65
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/8/2007	18.40875	18.17	18.69
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/9/2007	18.55042	18.31	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/10/2007	18.53792	18.27	18.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/11/2007	18.51083	18.24	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/12/2007	18.50375	18.27	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/13/2007	18.46667	18.17	18.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/14/2007	18.50875	18.24	18.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/15/2007	18.54667	18.31	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/16/2007	18.545	18.31	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/17/2007	18.45917	18.15	18.72
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/18/2007	18.48917	18.22	18.72
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/19/2007	18.52583	18.27	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/20/2007	18.67542	18.48	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/21/2007	18.6025	18.46	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/22/2007	18.61708	18.48	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/23/2007	18.55792	18.41	18.67
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/24/2007	18.55042	18.41	18.69
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/25/2007	18.57125	18.46	18.69
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/26/2007	18.59458	18.48	18.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/27/2007	18.61083	18.46	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/28/2007	18.65333	18.53	18.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/29/2007	18.77042	18.6	18.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/30/2007	18.93292	18.74	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/31/2007	19.02458	18.88	19.19

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/1/2007	18.88458	18.72	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/2/2007	18.8175	18.65	18.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/3/2007	18.79375	18.65	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/4/2007	18.78958	18.72	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/5/2007	18.715	18.58	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/6/2007	18.76458	18.65	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/7/2007	18.75917	18.65	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/8/2007	18.76792	18.69	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/9/2007	18.75	18.69	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/10/2007	18.73125	18.67	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/11/2007	18.74417	18.69	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/12/2007	18.72917	18.69	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/13/2007	18.71042	18.62	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/14/2007	18.78083	18.69	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/15/2007	18.77208	18.69	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/16/2007	18.79667	18.74	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/17/2007	18.79833	18.72	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/18/2007	18.81375	18.74	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/19/2007	18.74708	18.69	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/20/2007	18.69458	18.6	18.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/21/2007	18.74875	18.69	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/22/2007	18.77125	18.72	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/23/2007	18.75375	18.69	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/24/2007	18.76542	18.67	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/25/2007	18.78958	18.69	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/26/2007	18.83333	18.74	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/27/2007	18.86417	18.79	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/28/2007	18.86292	18.84	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/29/2007	18.76042	18.65	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/30/2007	18.73333	18.6	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/1/2007	18.80375	18.72	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/2/2007	18.845	18.77	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/3/2007	18.85292	18.77	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/4/2007	18.79083	18.72	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/5/2007	18.715	18.65	18.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/6/2007	18.68375	18.55	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/7/2007	18.75042	18.65	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/8/2007	18.82	18.72	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/9/2007	18.81042	18.74	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/10/2007	18.73458	18.29	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/11/2007	18.81958	18.69	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/12/2007	18.83833	18.79	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/13/2007	18.86333	18.77	18.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/14/2007	18.84417	18.72	18.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/15/2007	18.87042	18.77	18.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/16/2007	18.83708	18.77	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/17/2007	18.80333	18.72	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/18/2007	18.7225	18.6	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/19/2007	18.88667	18.79	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/20/2007	18.94167	18.88	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/21/2007	18.7925	18.69	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/22/2007	18.76833	18.62	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/23/2007	18.82917	18.69	18.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/24/2007	18.87667	18.72	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/25/2007	18.9075	18.79	19

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/26/2007	18.77667	18.65	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/27/2007	18.68083	18.53	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/28/2007	18.8175	18.67	19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/29/2007	18.90083	18.81	18.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/30/2007	18.86292	18.79	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/31/2007	18.82292	18.74	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/1/2007	18.81042	18.72	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/2/2007	18.79417	18.62	18.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/3/2007	18.83417	18.69	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/4/2007	18.815	18.67	18.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/5/2007	18.82125	18.69	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/6/2007	18.84542	18.79	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/7/2007	18.7525	18.62	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/8/2007	18.81833	18.79	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/9/2007	18.78292	18.72	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/10/2007	18.745	18.62	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/11/2007	18.74625	18.24	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/12/2007	18.88375	18.77	18.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/13/2007	18.91708	18.81	19.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/14/2007	19.01708	18.93	19.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/15/2007	19.00708	18.93	19.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/16/2007	18.91042	18.86	19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/17/2007	18.82042	18.74	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/18/2007	18.67667	18.53	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/19/2007	18.78083	18.65	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/20/2007	18.54083	18.41	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/21/2007	18.18958	18.05	18.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/22/2007	18.045	17.89	18.2
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/23/2007	18.10792	18.01	18.2
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/24/2007	18.04458	17.89	18.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/25/2007	18.14708	18.05	18.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/26/2007	18.28417	18.17	18.41
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/27/2007	18.30375	18.17	18.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/28/2007	18.36958	18.29	18.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/29/2007	18.10583	17.96	18.29
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/30/2007	18.04167	17.96	18.12
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/1/2007	17.94125	17.81	18.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/2/2007	18.2625	18.1	18.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/3/2007	18.46	18.39	18.58
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/4/2007	18.15667	17.58	18.53
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/5/2007	18.27417	18.2	18.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/6/2007	18.05042	17.65	18.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/7/2007	17.69792	17.34	17.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/8/2007	17.41125	16.93	17.72
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/9/2007	16.73083	16.29	17.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/10/2007	16.83708	16.43	17.15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/11/2007	16.74292	16.43	17.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/12/2007	16.77708	16.34	17.17
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/13/2007	17.03333	16.48	17.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/14/2007	17.04708	16.77	17.29
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/15/2007	17.25083	16.89	17.6
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/16/2007	17.43375	17.27	17.67
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/17/2007	17.52792	17.22	17.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/18/2007	17.06625	16.05	17.67
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/19/2007	17.68833	17.51	17.86

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/20/2007	17.65625	16.63	18.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/21/2007	17.95667	17.86	18.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/22/2007	17.885	17.74	18.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/23/2007	17.91125	17.77	18.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/24/2007	18.08375	17.93	18.24
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/25/2007	17.89542	17.72	18.15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/26/2007	17.88	17.84	17.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/27/2007	17.76583	17.65	17.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/28/2007	17.73458	17.58	17.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/29/2007	17.77042	17.53	18.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/30/2007	18.0575	18.01	18.12
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/31/2007	17.90833	17.79	18.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/1/2008	17.68875	16.77	18.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/2/2008	13.98292	12.82	16.51
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/3/2008	12.92417	12.41	13.83
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/4/2008	11.70167	10.9	13.44
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/5/2008	10.925	9.92	11.8
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/6/2008	10.845	9.97	11.73
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/7/2008	12.01542	11.61	12.6
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/8/2008	11.88792	11.51	12.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/9/2008	12.33917	11.9	12.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/10/2008	13.02958	12.58	13.64
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/11/2008	13.65875	13.32	14.21
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/12/2008	13.50792	13.11	14
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/13/2008	12.84958	12.05	13.47
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/14/2008	12.38583	11.51	13.06
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/15/2008	12.26333	11.78	12.7
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/16/2008	11.58708	10.95	12.07
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/17/2008	11.40292	10.71	12.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/18/2008	11.48125	10.61	12.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/19/2008	11.77792	10.73	12.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/20/2008	11.84958	11.17	12.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/21/2008	11.47167	8.96	12.55
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/22/2008	10.25917	8.89	11.63
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/23/2008	11.6375	11.05	12.21
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/24/2008	10.64417	9.28	11.9
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/25/2008	9.72542	9.18	10.17
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/26/2008	11.06583	10.02	12.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/27/2008	11.37875	10.9	12.02
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/28/2008	10.75833	10	11.63
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/29/2008	10.72208	9.97	11.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/30/2008	11.47542	10.73	12.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	1/31/2008	11.67542	11.1	12.26
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/1/2008	11.52833	10.71	12.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/2/2008	11.465	10.71	12.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/3/2008	11.92875	11.44	12.75
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/4/2008	11.68958	10.9	12.63
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/5/2008	11.13542	9.97	12.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/6/2008	11.90958	11.2	13.01
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/7/2008	11.47083	10.46	12.58
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/8/2008	11.59042	10.81	12.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/9/2008	10.93	9.41	12.67
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/10/2008	11.19583	9.7	12.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/11/2008	11.45958	9.85	13.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/12/2008	11.92917	10.36	13.66

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/13/2008	11.82667	10.9	13.13
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/14/2008	11.49625	10.34	12.82
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/15/2008	11.64583	10.19	13.13
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/16/2008	12.19792	10.83	13.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/17/2008	12.31333	11	13.78
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/18/2008	13.1325	12.38	14.07
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/19/2008	13.05167	12.31	13.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/20/2008	13.01917	12.24	14.24
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/21/2008	12.9575	12.24	13.78
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/22/2008	13.05917	12.65	13.52
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/23/2008	11.30625	9.73	12.6
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/24/2008	11.10083	9.65	12.5
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/25/2008	12.10167	11.29	13.28
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/26/2008	12.59417	10.98	14.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/27/2008	13.35652	11.75	15.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/28/2008	13.56	11.58	15.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	2/29/2008	13.83875	12.29	15.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/1/2008	13.45333	12.48	15.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/2/2008	12.775	11.34	14.6
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/3/2008	12.76042	10.78	15.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/4/2008	13.04042	11.07	15.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/5/2008	13.06667	11.37	15.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/6/2008	11.79667	10.07	13.42
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/7/2008	12.1275	10.29	13.95
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/8/2008	12.76833	10.88	14.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/9/2008	12.60333	10.51	14.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/10/2008	13.16667	11.27	15.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/11/2008	13.36417	11.71	15.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/12/2008	13.50167	12	15.17
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/13/2008	14.05	13.01	15.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/14/2008	13.08083	12.05	14.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/15/2008	12.7825	11.88	13.9
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/16/2008	12.85125	11.44	14.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/17/2008	13.22083	11.41	15.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/18/2008	13.93875	12.17	15.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/19/2008	13.875	12.26	15.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/20/2008	13.65583	12.19	15.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/21/2008	13.18458	11.29	15.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/22/2008	13.53792	11.46	15.53
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/23/2008	13.82417	11.95	15.62
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/24/2008	13.89667	11.83	15.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/25/2008	14.71125	13.25	16.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/26/2008	14.38042	12.89	15.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/27/2008	13.57	12.34	14.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/28/2008	13.41625	11.8	15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/29/2008	14.14667	13.37	15.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/30/2008	13.53125	12.14	15.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	3/31/2008	13.21375	11.27	15.15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/1/2008	14.02417	12.48	15.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/2/2008	13.92625	12.94	14.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/3/2008	14.69792	13.2	16.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/4/2008	14.6975	13.4	16.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/5/2008	14.39833	13.18	15.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/6/2008	14.33208	13.13	15.72
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/7/2008	14.05083	12.41	15.74

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/8/2008	13.79833	12.77	14.76
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/9/2008	14.51125	13.13	16.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/10/2008	14.68792	12.94	16.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/11/2008	15.25042	13.44	17.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/12/2008	16.11833	14.36	17.72
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/13/2008	16.67042	15.1	18.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/14/2008	16.04583	15.12	16.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/15/2008	14.59417	13.23	16.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/16/2008	14.50042	12.77	16.29
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/17/2008	15.27917	13.4	17.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/18/2008	15.76542	14.4	17.13
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/19/2008	14.97792	13.76	16.32
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/20/2008	14.06625	12.67	15.58
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/21/2008	13.91875	12.41	15.5
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/22/2008	14.015	12.84	15.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/23/2008	15.085	14.12	16.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/24/2008	14.79708	13.23	16.41
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/25/2008	15.27708	13.64	16.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/26/2008	15.86167	14.21	17.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/27/2008	16.66	15.24	17.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/28/2008	16.5275	15.34	17.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/29/2008	15.85917	14.67	17.01
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	4/30/2008	15.10708	13.88	16.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/1/2008	15.05833	13.47	16.7
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/2/2008	15.22208	14	16.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/3/2008	15.23208	13.76	16.7
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/4/2008	15.645	14.48	16.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/5/2008	15.46875	13.97	16.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/6/2008	16.00167	14.74	17.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/7/2008	15.90417	14.67	17.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/8/2008	15.73708	14.43	17.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/9/2008	15.60292	14.19	16.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/10/2008	15.69375	14.24	17.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/11/2008	16.26125	15.27	17.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/12/2008	15.8425	14.6	16.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/13/2008	16.02958	14.48	17.51
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/14/2008	16.66542	15.34	17.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/15/2008	17.45375	16.27	18.69
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/16/2008	17.90875	16.82	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/17/2008	17.79667	16.65	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/18/2008	17.5275	16.32	18.67
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/19/2008	17.43458	16.43	18.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/20/2008	17.27042	16.36	18.12
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/21/2008	16.555	15.34	17.67
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/22/2008	16.19375	14.91	17.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/23/2008	16.2175	15.03	17.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/24/2008	15.855	15.29	16.53
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/25/2008	15.60917	14.79	16.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/26/2008	16.02542	14.98	17.27
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/27/2008	16.275	15.29	17.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/28/2008	15.89583	14.79	16.82
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/29/2008	16.27	15.15	17.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/30/2008	16.87208	15.98	17.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	5/31/2008	16.87958	16.08	17.67
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/1/2008	16.68458	15.6	17.74

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/2/2008	16.39958	15	17.62
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/3/2008	16.74958	15.77	17.7
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/4/2008	16.99333	16.08	17.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/5/2008	16.96083	15.84	17.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/6/2008	17.14667	16.27	17.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/7/2008	16.82333	15.55	17.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/8/2008	17.28375	16.17	18.29
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/9/2008	17.6825	16.72	18.65
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/10/2008	17.995	17.27	18.72
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/11/2008	17.84792	17.08	18.6
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/12/2008	17.74917	16.84	18.62
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/13/2008	17.92458	17.2	18.67
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/14/2008	17.87583	17.17	18.55
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/15/2008	17.74833	17.01	18.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/16/2008	17.65167	17.03	18.27
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/17/2008	17.63583	16.84	18.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/18/2008	17.72833	16.89	18.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/19/2008	17.75792	16.86	18.58
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/20/2008	18.13292	17.39	18.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/21/2008	18.33875	17.86	18.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/22/2008	18.06708	17.48	18.6
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/23/2008	17.80917	17.24	18.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/24/2008	17.60833	16.96	18.15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/25/2008	17.65375	17.15	18.12
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/26/2008	17.60375	16.96	18.2
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/27/2008	17.91333	17.41	18.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/28/2008	17.975	17.55	18.41
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/29/2008	17.93417	17.51	18.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	6/30/2008	17.96167	17.55	18.41
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/1/2008	17.95792	17.6	18.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/2/2008	17.97083	17.48	18.5
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/3/2008	18.22292	17.62	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/4/2008	18.36625	17.93	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/5/2008	18.27792	17.74	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/6/2008	18.48625	17.89	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/7/2008	18.64083	18.01	19.38
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/8/2008	18.91875	18.29	19.67
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/9/2008	18.94458	18.36	19.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/10/2008	18.94417	18.36	19.6
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/11/2008	18.6725	18.12	19.12
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/12/2008	18.54375	18.05	19.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/13/2008	18.53417	18.1	19.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/14/2008	18.62417	18.22	19.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/15/2008	18.47917	18.1	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/16/2008	18.39792	17.98	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/17/2008	18.39958	17.96	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/18/2008	18.28208	17.74	18.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/19/2008	18.21292	17.72	18.72
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/20/2008	18.14125	17.72	18.55
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/21/2008	17.98333	17.55	18.41
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/22/2008	18.16167	17.65	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/23/2008	18.34333	17.74	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/24/2008	18.28083	17.67	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/25/2008	18.23458	17.67	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/26/2008	18.37125	17.77	19

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/27/2008	18.49875	18.03	19.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/28/2008	18.38292	17.98	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/29/2008	18.345	17.91	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/30/2008	18.2625	17.7	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	7/31/2008	18.32667	17.81	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/1/2008	18.25958	17.65	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/2/2008	18.475	17.93	19.1
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/3/2008	18.3125	17.74	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/4/2008	18.37833	17.91	18.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/5/2008	18.39792	17.98	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/6/2008	18.42917	17.98	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/7/2008	18.42417	17.96	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/8/2008	18.40458	17.96	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/9/2008	18.335	17.72	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/10/2008	18.33167	17.55	18.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/11/2008	18.58167	17.84	19.29
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/12/2008	18.64083	18.03	19.15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/13/2008	18.67125	18.15	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/14/2008	18.82708	18.43	19.24
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/15/2008	18.92875	18.43	19.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/16/2008	18.89875	18.41	19.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/17/2008	18.72	18.24	19.19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/18/2008	18.58792	18.27	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/19/2008	18.59458	18.29	18.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/20/2008	18.65458	18.36	19.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/21/2008	18.78208	18.53	19.05
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/22/2008	18.64417	18.34	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/23/2008	18.66958	18.41	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/24/2008	18.655	18.36	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/25/2008	18.71708	18.39	19.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/26/2008	18.57125	18.12	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/27/2008	18.63167	18.2	19.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/28/2008	18.85583	18.48	19.29
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/29/2008	18.98792	18.6	19.41
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/30/2008	18.88292	18.53	19.17
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	8/31/2008	18.52333	18.12	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/1/2008	18.19958	17.58	18.6
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/2/2008	18.2475	17.6	18.72
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/3/2008	18.41458	17.84	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/4/2008	18.69417	18.24	19.15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/5/2008	18.81542	18.36	19.24
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/6/2008	18.80917	18.34	19.17
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/7/2008	18.79	18.39	19.12
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/8/2008	18.69625	18.34	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/9/2008	18.63458	18.39	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/10/2008	18.59208	18.39	18.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/11/2008	18.6725	18.5	18.88
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/12/2008	18.71333	18.58	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/13/2008	18.67708	18.53	18.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/14/2008	18.63833	18.48	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/15/2008	18.62583	18.48	18.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/16/2008	18.6325	18.5	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/17/2008	18.62083	18.5	18.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/18/2008	18.34333	17.91	18.6
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/19/2008	18.28125	17.81	18.6

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/20/2008	18.64417	18.55	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/21/2008	18.62792	18.48	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/22/2008	18.45292	18.01	18.69
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/23/2008	18.49833	18.1	18.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/24/2008	18.58375	18.27	18.79
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/25/2008	18.55125	18.2	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/26/2008	18.72417	18.5	18.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/27/2008	18.7875	18.58	18.96
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/28/2008	18.78583	18.58	18.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/29/2008	18.80375	18.67	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	9/30/2008	18.71	18.46	18.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/1/2008	18.83042	18.62	19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/2/2008	18.88542	18.77	19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/3/2008	18.86875	18.72	19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/4/2008	18.89542	18.81	18.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/5/2008	18.51833	18.08	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/6/2008	18.8275	18.69	19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/7/2008	18.87083	18.74	19
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/8/2008	18.82083	18.58	18.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/9/2008	18.53667	18.1	18.86
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/10/2008	17.90333	17.36	18.46
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/11/2008	17.4725	17.05	17.93
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/12/2008	16.93042	16.05	17.62
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/13/2008	17.00667	15.84	17.91
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/14/2008	17.56625	16.65	18.27
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/15/2008	17.74625	16.86	18.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/16/2008	17.90125	17.08	18.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/17/2008	18.0375	17.27	18.55
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/18/2008	18.23667	17.7	18.62
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/19/2008	18.01583	17.55	18.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/20/2008	18.0025	17.58	18.39
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/21/2008	17.5725	16.72	18.22
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/22/2008	17.64083	16.79	18.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/23/2008	17.89125	17.15	18.5
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/24/2008	17.99375	17.36	18.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/25/2008	17.98292	17.29	18.5
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/26/2008	17.98125	17.36	18.48
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/27/2008	18.24667	17.93	18.58
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/28/2008	18.11083	17.79	18.5
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/29/2008	17.86417	17.27	18.29
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/30/2008	17.65083	17.34	17.98
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	10/31/2008	18.29167	17.89	18.74
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/1/2008	18.39208	17.29	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/2/2008	18.51708	17.86	18.84
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/3/2008	18.50833	18.27	18.72
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/4/2008	18.34708	18.03	18.55
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/5/2008	17.58125	17.15	17.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/6/2008	17.70208	17.29	18.17
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/7/2008	18.00667	17.62	18.41
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/8/2008	18.0075	17.65	18.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/9/2008	18.0525	17.77	18.31
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/10/2008	18.08958	17.89	18.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/11/2008	18.07583	17.89	18.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/12/2008	18.24167	18.05	18.53
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/13/2008	18.39625	18.15	18.72

GIS ID	Facility Name	Facility Type	Station Number	Station Description	Legacy Codes	Param Short Name	Param Type Name	Units	Min Value	Max Value	Meas date	Avg Daily Value	Min Daily Value	Max Daily Value
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/14/2008	18.455	18.1	18.77
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/15/2008	18.40417	18.03	18.72
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/16/2008	18.25375	17.84	18.67
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/17/2008	18.20333	17.79	18.58
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/18/2008	18.01333	17.65	18.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/19/2008	18.04083	17.93	18.2
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/20/2008	18.02833	17.79	18.34
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/21/2008	17.87042	17.62	18.15
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/22/2008	17.56667	17.27	17.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/23/2008	17.43792	17.05	17.81
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/24/2008	17.73292	17.51	18.03
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/25/2008	17.77792	17.53	18.01
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/26/2008	17.41833	16.36	17.89
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/27/2008	18.08083	17.77	18.36
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/28/2008	18.15625	17.91	18.27
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/29/2008	17.93792	17.72	18.24
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	11/30/2008	17.7775	17.43	18.08
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/1/2008	17.66333	17.36	18.01
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/2/2008	18.20167	18.03	18.43
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/3/2008	17.9025	17.67	18.2
30100	ALAMITOS CREEK	CREEK	30100-13	Inlet to Almaden Lake. u/s of Inlet to Almaden Lake.	C2200 07082000LP-026	WT	Water Temperature	C	0	30	12/4/2008	17.64714	17.55	17.79

Santa Clara Valley Water District Committee Agenda Memo dated February 27, 2017

Response to Letter from Mr. Richard McMurtry, dated January 28, 2017, and Submitted to the Committee on January 31, 2017 as Handout 2-A

Committee:	CIP Ad Hoc
Meeting Date:	02/27/17
Item No.:	4.3
Unc Mgr:	G. Hall
Email:	ghall@valleywater.org

COMMITTEE AGENDA MEMO

SUBJECT: Response to Letter from Mr. Richard McMurtry, dated January 28, 2017, and Submitted to the Committee on January 31, 2017 as Handout 2-A.

RECOMMENDED ACTION:

Receive information from staff and discuss an approach for addressing the various requests from stakeholders for fish habitat improvement projects into the CIP.

SUMMARY:

At the January 31, 2017 CIP Ad Hoc Committee Meeting Mr. Richard McMurtry provided a letter requesting the addition of three feasibility studies the CIP to evaluate the operation and modification of Alamitos Percolation dam and/or Vasona reservoir – key instream water diversion facilities -- to improve fish habitat.

This request is among many received by the District from parties asking for removal or modification of instream recharge facilities (or studies that might indicate the benefits of doing so). These facilities support groundwater recharge and provide water supply to purveyors in the county and are operated with appropriate permits and all have water right allocations permitted by the State Water Resources Control Board (SWRCB). The future operation of these facilities is under consideration as part of the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE) process to address an earlier water rights complaint. Such projects require balancing habitat improvement with water supply and groundwater protection, and require agreement by stakeholders and regulatory agencies charged with protection of these resources.

Staff has reviewed Mr. McMurtry's request and advises that, in accordance with Section 6.2.4.2 of the FAHCE settlement agreement, these concepts can be incorporated in the many studies and candidate projects that will be considered in the Adaptive Management Program, developed to support the FAHCE water rights settlement.

The problem with making commitments now towards these studies and projects is that it's not clear, at least to staff, that these specific studies and projects should be assigned top priority among all the others that will ultimately be incorporated into the Adaptive Management Program. Staff recommends an adaptive management approach that relies on stakeholder input and incorporates all appropriate information to identify the most effective solutions. Staff then anticipates receiving Board direction on which studies and projects should be incorporated into the Adaptive Management Program and which, among those, should be implemented with highest priority.

BACKGROUND:

At the January 10, 2012 Board meeting, the Board formed the CIP Ad Hoc Committee to facilitate in-depth discussion about the CIP.

Each year a five-year Capital Improvement Program (CIP) is prepared for Board consideration and approval. The CIP communicates the District's capital investment priorities, and provides information on the planned capital projects and possible sources of funding for the projects. The CIP works in concert with the annual budget process, wherein funding is appropriated to the individual projects.

ATTACHMENT(S):

Attachment 1: 013117 Item 2-A, Handout, R. McMurtry

Michelle Meredith

Subject: FW: Recommendations to CIP Committee
Attachments: 28 January 2017 recommendations.docx; Alamitos Drop Structure Feasibility Study Proposal Overview.pdf; Problem statement.docx

From: Richard McMurtry [mailto:rmcmurtry@baymoon.com]
Sent: Saturday, January 28, 2017 7:18 AM
To: Clerk of the Board <clerkoftheboard@valleywater.org>; John Varela <jvarela@valleywater.org>; Nai Hsueh <NHsueh@valleywater.org>; Tony Estremera <TEstremera@valleywater.org>
Subject: Recommendations to CIP Committee

Dear Clerk of the Board,

Can you please forward this to the members of the CIP committee for its Jan 30th meeting?

Richard

Richard McMurtry
Santa Clara County Creeks Coalition
http://www.sccreeks.org
24010 Summit Road
Los Gatos, CA 95033
408-442-4932

28 January 2017

The Honorable Nai Hsueh
The Honorable Tony Estremera
The Honorable John Varela
Members of the CIP Committee
Santa Clara Valley Water District
By email

Dear Ms. Hsueh, Mr. Estremera and Mr. Varela,

I am writing to request that you consider making additions to the CIP for the next fiscal year and adopt a clearer more consistent policy with respect to the early implementation of these projects.

The three projects I recommend are:

1. Feasibility study to cease operation of the Alamitos flashboard dam forthwith (as soon as possible) by construction of a pipeline to fill the the Alamitos perc ponds without the use of the flashboard dam so as to achieve improved habitat and fish passage conditions in Alamitos Creek

2. Feasilbity study to modify the Alamitos Drop structure to improve the flow of gravel to downstream locations for improved spawning and to improve fish habitat and passage conditions

3. Feasiblity study to address the elevated temperatures created by Lake Vasona and the backwater to the Kirk Diversion facility to improve temperature conditions in the 6 miles between the Campbell Drop Structure and the confluence with the Guadalupe River.

Attached is technical information in support of these recommendations.

The need for a clearer policy statement was evidenced in a recent meeting with staff where staff asserted that FAHCE will address the issues associated with the Alamitos Drop Structure and Flashboard Dam. Staff asserted this even though the FAHCE agreement does not mention this facility in the context of the above goals and the Water Utility staff have declined to include this facility in the publically available Fishery Habitat Restoration Plan being produced pursuant to FAHCE.

The guidance given by the Board to staff on June 28th to "get these fishery project done" should have been sufficient to elicit a more proactive approach to the above projects. However, the Board's discussion of FAHCE in December could be interpreted by staff to imply a "wait for FAHCE" approach.

I recommend that the CIP Committee recommend to the full Board the adoption of a strategy statement to make unequivocal the Board's commitment to expedite the planning and construction of the

fishery projects necessary to improve fish passage and habitat on Santa Clara streams, pursuant to the policy adopted by the Board in July 2012, namely:

4.1.6. To the extent within practicable control of the District, adopt a strategy to restore the salmonid fishery on identified salmonid streams within fifteen years of strategy adoption by creating suitable accessible spawning and rearing habitats.

Proposed Strategy

1. That staff expedite the completion of the FAHCE process while assuring the process resolve the technical issues needed for successful achievement of environmental goals of FAHCE.
2. That staff pursue, in parallel with FAHCE, the expedited planning and construction of the fish migration barrier removals and habitat improvement project specified by FAHCE.
3. That staff pursue the expedited feasibility studies for the Alamitos Drop Structure/Flashboard Dam and Los Gatos Temperature Conditions Improvement Projects and request State Water Resources Control Board amendment of its water rights licenses to include these feasibility studies as a condition of the license prior to completion of FAHCE.

Sincerely,

Richard McMurtry
24010 Summit Road
Los Gatos, CA 95033
RMcMurtry@baymoon.com

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Regional Water Quality Control Board

Excerpts from Response to Comments re: Temperature Criteria for Impairment of Beneficial Uses for Listing of Los Gatos Creek March 2019

The commenter may submit comments on this de-listing as part of the State Water Board's public process that will take place later in 2019. We encourage the commenter to sign up for the email list to receive notifications of the State Water Board's public process.

Comment Letter 2: Santa Clara County Creeks Coalition

Comment 2.1: The commenter writes to "express strong support for the listing of Los Gatos Creek as impaired by temperature".

We appreciate the comment supporting our temperature evaluation and listing recommendation.

Comment 2.2: The commenter also requests "that, as part of the TMDL process, the Regional Board consider the instream flow needs of the creek as it impacts temperature."

While future TMDL development considerations are outside the scope of the public process for the 2018 303(d) List recommendations we note that, in general, we will consider all controllable factors associated with a given impairment when developing a TMDL. The commenter included two attachments supporting the request for the TMDL process to include consideration of flow requirements. These are included in the comments package, but we are not offering a response to them because they do not contain comments on the lower Los Gatos Creek listing recommendation.

Comment Letter 3: Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP)

Comment 3.1: "We would like to point out that there was insufficient time provided by the SF Bay Water Quality Control Board (SF Bay Water Board) to adequately review the data used to propose the new listing and provide meaningful comments. For this reason, these comments should be considered preliminary. The release of the public notice occurred on Friday, December 21st (prior to the winter holiday season), with comments due on January 21st, 2019 (Martin Luther King Day). The timeline provided less than one month (including holidays and weekends) to review a dataset with millions of data points (i.e., hourly data collected at 32 sites over a 13-year period) and the evaluation guidelines used by the SF Bay Water Board staff to support the listing."

The Regional Water Board's 30-day comment period complied with the requirement in Listing Policy section 6.2 to provide the "[a]dvance notice and opportunity for public comment." The Regional Water Board also complied with the applicable 30-day noticing and document review requirements (40 CFR § 25.5), which is the standard requirement for changes to the 303(d) List. A consultant representing SCVURPPP contacted Regional Water Board staff to request data on January 11 (21 days after the start of the public review period), and we responded the same day with detailed information on the temperature evaluation guidelines and provided the evaluated temperature data in a convenient format for their analysis. We note that SCVURPPP did not request an extension to the comment period.

Comment 3.2: "Evaluation guidelines are not from peer reviewed sources as required by listing policy. The documents from which evaluation guidelines were taken were not journal articles."

All four of the guidelines used in the Los Gatos Creek temperature assessment comply with Section 6.1.3 of the Listing Policy and have been used in previous listing decisions. Section 6.1.3 of the Listing Policy describes the requirements for using an evaluation guideline when a numeric water quality objective is not available: "Narrative water quality objectives shall be evaluated using evaluation guidelines. When evaluating narrative water quality objectives or beneficial use protection, the Regional Water Boards and the State Water Board shall identify evaluation guidelines that represent standards attainment or beneficial use protection. The guidelines are not water quality objectives and shall only be used for the purpose of developing the section 303(d) List." In addition, the evaluation guideline should: "be applicable to the beneficial use; be protective of the beneficial use; be linked to the pollutant under consideration; be scientifically-based and peer reviewed; be well described; and identify a range above which impacts occur and below which no or few impacts are predicted." Since there is no clear numeric objective for temperature in the San Francisco Bay Basin Water Quality Control Plan, we used guidelines that are related to the protection of several beneficial uses which apply to Los Gatos Creek (cold water habitat, , spawning, migration). We relied on these four evaluation guidelines to assess temperature in Los Gatos Creek and have noted references that support those thresholds.

- **7DADM**: The 7-day average daily maximum temperature, which is the rolling seven-day average of daily maximum temperature compared to a threshold of 20 °C for the period March 1 through June 15 (steelhead out-migration period) (U.S. EPA, 2003, Shapovalov and Taft, 1954)[1]
- **Lethal**: Days for which the temperature, at any time, exceeded 24 °C (U.S. EPA 1977, Moyle 1976, Carter 2008), a temperature associated with lethality for steelhead (from March 1 through October 31)
- **MWAT**: The maximum weekly average temperature (from March 1 through October 31, summer rearing for steelhead) at each station for each year compared to 19.6 °C (Sullivan 2000)
- **7DAVG**: The rolling seven-day average temperature from March 1 through October 31(summer rearing for steelhead) compared to a threshold of 17 °C (Sullivan 2000)

The 7DADM evaluation guideline from U.S. EPA (2003) meets the requirements of California's Listing Policy and has been used as an evaluation guideline in several temperature listing decisions in California. Two independent scientific peer review panels were convened to provide comment on various aspects of the guidance and the scientific issue papers upon which the guidance relied. We evaluated temperature data against the 20 °C 7DADM, which is appropriate to assess the threat to migration in a creek in the southern portion of the steelhead range. U.S. EPA has not only accepted listing decisions using this evaluation guideline, they explicitly defended use of the 20 °C 7DADM in

[1] Note that this migration period is different than that used for the analysis contained in the Staff Report release to the public in December 2018. Please see the response to SCVWD comment 4.1 for more details on this change.

California streams and rivers in their approval letter on California's 2008-2010 303(d) List (page 22). They provide the following justification for its use in their 2003 guidance document.

> *"The recommended metric for all of the following criteria is the maximum 7-day average of the daily maxima (7DADM). This metric is recommended because it describes the maximum temperatures in a stream, but it is not overly influenced by the maximum temperature of a single day. Thus, it reflects an average of maximum temperatures that fish are exposed to over a weeklong period. Since this metric is oriented to daily maximum temperatures, it can be used to protect against acute effects, such as lethality and migration blockage conditions.*
>
> *….EPA believes that a 20°C criterion would protect migrating juveniles and adults from lethal temperatures and would prevent migration blockage conditions."*

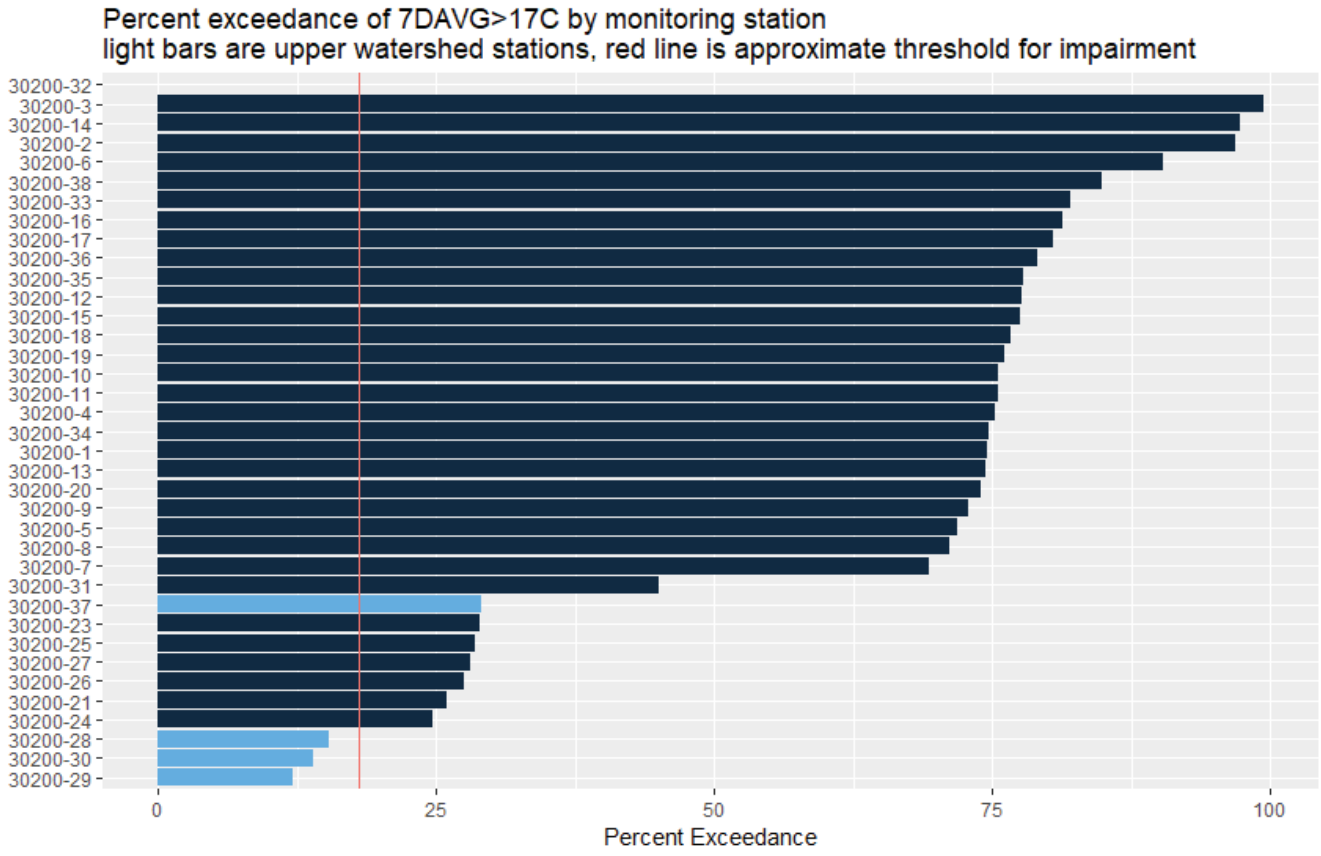
The evaluation guideline corresponding to lethal temperatures (24 °C) for steelhead is from a reputable U.S. EPA research document (U.S. EPA 1977) reviewed by six independent scientists. This threshold is also discussed in Carter (2008), a report subjected to scientific peer reviewed as part of the Klamath River TMDL process. The responses to peer review comments for the Klamath River TMDL project are available online. This 24 °C lethal threshold is consistent with lethal temperatures for steelhead identified by other frequently-cited authors (Moyle 1976, Bell 1986). Moyle specifically focuses on California fish so the thresholds he presents are applicable to California. This evaluation guideline meets the requirements of Section 6.1.3 of the Listing Policy and has been widely used in U.S. EPA-approved listing decisions in our region and elsewhere in California. The 24 °C temperature evaluation guideline was used in our region in a line of evidence resulting in a decision to place Arroyo Mocho on the 303(d) List in 2010. This evaluation guideline was also used in temperature assessments in our region for Indian Creek in 2010, Devil's Gulch Creek in 2010, Coyote Creek in 2010, San Leandro Creek in 2010, Ritchie Creek in 2010, Redwood Creek (Marin) 2010, Mitchell Creek in 2010, Las Trampas Creek in 2010 as well numerous temperature assessments in other regions.

The remaining two temperature evaluation guidelines (MWAT and 7DAVG) are from a reputable and frequently-cited[2] report by Sullivan (2000) that reviews several peer-reviewed papers on temperature requirements for salmonids. Sullivan relies on peer-reviewed literature to develop a risk-based approach for setting temperature criteria and assessing temperature risk to fish. Temperature in streams is not uniform in space or time, but consistent exceedance of these temperature thresholds suggests that high temperatures are impairing aquatic life, and that water quality standards are not being met. The evaluation guidelines from Sullivan have been widely used in Section 303(d) temperature assessments in the San Francisco Bay and North Coast Regions, and these assessments have been accepted by U.S. EPA as part of several California integrated reports. For example, the seven-day

[2] A Google Scholar search on February 11, 2019 shows that the Sullivan 2000 paper is cited by more than 120 scholarly articles and books.

average temperature (7DAVG) evaluation guideline (17 °C) from Sullivan was used in the listing of Suisun Creek in 2010, Stevens Creek in 2010, Codornices Creek in 2010, Arroyo Mocho in 2010, and as a line of evidence in temperature assessments (not resulting in listings) for more than twenty additional creeks and rivers in our region.

We evaluated temperature data in both lower and upper Los Gatos Creek to determine if average temperatures support the cold water beneficial use. We found that temperatures in the lower watershed were too high on average to support this use. Combining data from all lower Los Gatos Creek monitoring stations, 65% of the 7-day moving averages exceeded the 7DAVG evaluation guideline. Average temperatures in the upper watershed exceeded the evaluation guideline less than 17% of the time and were, thus, considered supportive of the use. The figure below shows that the exceedance frequency of the 7DAVG evaluation guideline ranged from 25% to nearly 100% at monitoring locations in lower Los Gatos Creek. The exceedance frequency is much lower at upper water stations shown as light blue bars in the figure.



Comment 3.3: "Evaluation guidelines are not applicable to streams in Santa Clara County, but rather cold water salmonid streams of Washington and/or Oregon. Guidelines developed for streams in the Pacific Northwest may not be applicable to streams in other ecoregions, such as the drier and warmer salmonid streams in Santa Clara County."

As explained in the response to comment 3.2, all the temperature evaluation guidelines used to assess Los Gatos Creek have previously been applied to waterbodies in many parts of California, including many waterbodies in the San Francisco Bay Region with climates like those found in Santa Clara County. These assessments and the evaluation guidelines used therein have been accepted by the State Water Board and U.S. EPA through their approval of the 303(d) Lists for which these temperature assessments were developed. We recognize that fish bioenergetics plays an important role and that if food supplies are abundant, then salmonids may be able to grow and develop in warmer waters[3]. However, without sufficient food supply data or bioenergetic studies, we are required to assess all readily available water quality data using guidelines according to the Listing Policy.

Comment 3.4: "Sullivan et al. (2000) risk assessment approach relies on the effects of temperature on juvenile salmon growth rates in a laboratory setting. These dose-response relationships established in a laboratory may not be representative of what is present in highly variable natural stream conditions."

California and other states frequently rely on water quality objectives and evaluation guidelines derived through laboratory studies to assess water quality and determine if waters are impaired. It is neither feasible nor required by the Listing Policy to test all such evaluation guidelines in "real-world" conditions prior to making assessments. Water Board staff use professional judgement to select the best available evaluation guidelines to assess available data. In this case, we used a suite of four temperature evaluation guidelines from technical sources (Carter 2008, Sullivan 2000, U.S. EPA 1977, U.S EPA 2003) that have been used in California and the San Francisco Bay Region. These are described more fully in response to comment 3.2. We acknowledge that stream conditions are highly variable, and it is not possible to determine the precise exposure of steelhead to stream temperatures. However, we feel confident that we have accounted for the variability of stream conditions given that we compared our evaluation guidelines to over two million temperature measurements taken hourly over a period of twelve years at over thirty locations along Los Gatos Creek.

Comment 3.5: "Several case studies demonstrate that the Central California Coast Steelhead Distinct Population Segment (DPS)2 have adapted feeding behaviors and life history strategies to deal with warmer water temperatures characteristic of the southern end of their range. Smith and Li (1983) observed that juvenile steelhead will tolerate warmer temperatures when food is abundant by moving into riffle habitats to increase feeding success. Juvenile steelhead will also move into coastal estuaries to feed during the summer season when stream conditions become stressful to the fish (Moyle 2008)."

A finding of impairment is a determination that conditions in the creek are not suitable to fully protect one or more beneficial uses, in this case cold water beneficial use and migration beneficial use related to steelhead habitat. The temperature-related challenges for steelhead in Lower Los Gatos Creek are significant (see figure below in the response to SCVWD

[3] See response to comment 4.3. Sloat and Osterback findings suggest "*that increased food production is not likely to sufficiently offset the energetic cost of activity at temperatures approaching tolerance limits.*"

comment 4.3). There are large portions of the lower Creek where, on more than 20% of the days, the temperature of the creek exceeds the lethal temperature of 24°C. Throughout the portion of Los Gatos Creek below Lexington Reservoir, the rolling 7-day average temperature exceeded the evaluation guideline (for steelhead protection) 65% of time, well above the threshold associated with impairment. While it may be true that steelhead have some capacity to adapt to adverse conditions, we have an obligation to identify water quality impairments when stream temperatures exceed relevant evaluation guidelines by such a large margin. Also, in the absence of data showing the food supply is abundant and that the bioenergetics of fish are not impacted by the current temperate regime, listing the stream based on regional analysis is appropriate and environmentally protective.

Steelhead have used the lower, warmer portion of Los Gatos Creek during the spring and summer. Thus, temperatures in lower Los Gatos Creek have directly affected this protected species. Steelhead were observed in summer 2001 in lower Los Gatos Creek at Leigh Avenue, and spawning steelhead were observed at Hamilton Ave. and at Meridien Ave. in 1998 (Leidy et al. 2005). At the four monitoring stations within one kilometer of Leigh Ave., stream temperatures during March through October reached the lethal threshold of 24 °C on 25% of the days, and 76% of the 7-day rolling average temperatures exceed the evaluation guideline of 17 °C. These data suggest that adult steelhead have used a portion of the lower Los Gatos Creek during the summer where the habitat is not suitable for their survival. Steelhead presently making use of these same sections of lower Los Gatos Creek will similarly be exposed to water temperatures above thresholds associated with harm. A high fraction of the days in this portion of the creek have a temperature above the lethal threshold, and a high proportion of the 7-day averages are above the established threshold for steelhead summer rearing. See also the response to comment 3.6 citing a National Oceanic and Atmospheric Administration Marine Fisheries Service (NOAA NMFS) view that there is little justification that steelhead can undergo large adaptation to different temperature regimes.

Comment 3.6: "Temperature guidelines used to evaluate temperature data in Los Gatos Creek (and other Bay Area streams) should be based on peer-reviewed case studies that evaluate temperature effects on salmonid populations that occur in watersheds of the Central Coast region."

We are obligated to assess available data against evaluation guidelines that meet the requirements of the Listing Policy, which is what we have done. The evaluation guidelines we used have have been accepted by U.S. EPA when used in previous California 303(d) Lists and are suitable for Los Gatos Creek. The 1977 U.S. EPA technical document from which we selected the lethal threshold was reviewed by six independent scientists, and the 2003 U.S. EPA guidance document from which we selected the 7DADM guideline was reviewed by two separate peer review panels.

In their approval letter for the 2008-2010 303(d) List for California, U.S. EPA cites a correspondence dated November 15, 2010 (pp 5-6) from Maria Rea (NOAA NMFS) to Alexis

Strauss (Regional Administrator for U.S. EPA Region 9) supporting the use of the temperature guidance values for a California river (emphasis added):

> *"The use of the US EPA 2003 criteria for listing water temperature impaired water bodies in the San Joaquin River basin is scientifically justified. It has been recognized that salmonid stocks do not tend to vary much in their life history thermal needs, regardless of their geographic location.* ***There is not enough significant genetic variation among stocks or among species of salmonids to warrant geographically specific water temperature standards*** *(US EPA 2001[4]). Based upon reviewing a large volume of thermal tolerance literature, McCullough (1999[5]) concluded* ***that there appears to be little justification for assuming large genetic adaptation on a regional basis to temperature regimes****."*

This passage in the U.S. EPA approval letter supports our view that the evaluation guidelines we selected, even those developed for the Pacific Northwest, are appropriate to protect steelhead in Los Gatos Creek. Please see the response to comment 3.2 for more information.

Comment 3.7: The Water Board "should delay consideration of listing Los Gatos Creek until thorough review of applicable published literature is accomplished."

We have used evaluation guidelines consistent with the Listing Policy and appropriate for Los Gatos Creek. However, we are open to recognizing the value of site-specific or regional temperature thresholds to develop TMDL temperature targets, but we do not recommend delaying the proposed listing until such new temperature thresholds are available. Based on our current understanding of temperature requirements for steelhead, we think it is unlikely that site-specific or regional temperature metrics will deviate substantially from those we used. Please see the response to comment 3.2 for more information.

Comment 3.8: "There are existing efforts to increase salmonid populations in the San Francisco Bay. Should the SF Bay Water Board proceed with the listing for temperature (after appropriate temperature guidelines are established), it should be placed into Category 4b (TMDL is not needed because other pollution control requirements are expected to result in the attainment of an applicable water quality standard in a reasonable period of time). Development of a TMDL for temperature in Los Gatos Creek will divert local resources away from implementing the recommendations in the FAHCE agreement and delay further recovery of salmonids in Santa Clara County watersheds."

We disagree that Los Gatos Creek should be placed into Category 4(b) because existing efforts (contained in the FAHCE agreement) will not be sufficient to resolve the temperature impairment in Los Gatos Creek. U.S. EPA regulations recognize that by using other pollution control requirements, states may resolve the impairment without a TMDL (40 CFR 130.7(b)(1)). Waterbodies for which alternatives to TMDLs will be used to resolve the

[4] EPA 2001a. Salmonid Behavior and Water Temperature, Issue Paper 1, prepared by Sally Sauter, John McMillan and Jason Dunham as Part of EPA Region 10 Temperature Water Quality Criteria Guidance Development Project. EPA-910-D-01-001, May 2001. 38 pp.

[5] McCullough, D.A. 1999. A Review and Synthesis of Effects of Alterations to the Water Temperature Regime on Freshwater Life Stages of Salmonids, With Special Reference to Chinook Salmon. Prepared for the U.S. Environmental Protection Agency Region 10, Seattle, Washington. Published as EPA 910-R-99-010, July 1999. 291 p.

Regional Water Quality Control Board

Excerpts from Basin Plan re: Section 3.3.17 Temperature Water Quality Objectives

3.3.17 TEMPERATURE

Temperature objectives for enclosed bays and estuaries are as specified in the "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California," including any revisions to the plan.

In addition, the following temperature objectives apply to surface waters:

- The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses.
- The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature

Attachment G-2:

Jeff Watt
Attachments to Comment Letter Dated
January 10, 2020

Master's Project by Emily Chortek: *Remediation Strategies for Mercury Contaminated Lakes and Reservoirs Within the State of California*; Submitted on December 17, 2017

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Remediation Strategies for Mercury Contaminated Lakes and Reservoirs Within the State of California

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This Master's Project

REMEDIATION STRATEGIES FOR MERCURY CONTAMINATED LAKES AND RESERVOIRS WITHIN THE STATE OF CALIFORNIA

by

Emily Chortek

is submitted in partial fulfillment of the requirements for the degree of:

Master of Science

In

Environmental Management

at the

University of San Francisco

Submitted:

December 14, 2017

Submitted:		Received:	
……		……	
Emily Chortek	Date	Gretchen Coffman, Ph. D.	Date

Table of Contents

List of Tables ..... **iv**

List of Figures ..... **v**

List of Acronyms and Abbreviations ..... **vi**

Abstract ..... **vii**

Introduction **1**
Sources of Mercury 1
Historic Mercury Pollution from Gold Mining Practices in California 1
Mercury Speciation 2
Mercury Cycling in Freshwater Systems 3
Why is Methylmercury an Environmental and Public Health Concern? 5

Research Objectives: **6**

Methods **7**

In Situ Aeration and Oxygenation **7**
Lake Stratification 7
Oxygen Availability in Lakes and Reservoirs 9
What is Hypolimnetic Oxygenation? 10
How Does Hypolimnetic Oxygenation Inhibit Methylmercury Production? 10
Hypolimnetic Oxygenation Devices and Systems 11
Biological and Chemical Benefits of Maintaining an Aerobic Hypolimnion 13
Benefits of Implementing Hypolimnetic Oxygenation 14
Challenges of Implementing Hypolimnetic Oxygenation 15

In Situ Aqueous Capping **16**
Benefits of Implementing In-Situ Aqueous Capping 17
Challenges to Implementing In-Situ Aqueous Capping 18

In Situ Dredging **19**
Benefits Associated with In Situ Dredging 20
Challenges Associated with In Situ Dredging 21

Phytoremediation **23**
Benefits of Implementing Phytoremediation 23
Challenges of Implementing Phytoremediation 25

Chemical Additions **26**
Environmentally Relevant Reducing-Oxidizing (Redox) Conditions 26
Nitrate Addition as a Remediation Strategy 28
Benefits of Implementing Nitrate Addition 29
Challenges of Implementing Nitrate Addition 30

Comparative Analysis of Remediation Methods **31**

Recommendations 39
Implement Hypolimnetic Oxygenation for Effective Mercury Control 39
Statewide Ranking of Contaminated Lakes 40
Monitor Mercury Concentrations at Lower Trophic Levels 41
Reduce Atmospheric Mercury Emissions 41
Consumption of Fish Species Lower on the Food Chain 44
Literature Cited 47

List of Tables

Table 1. Mercury species found in the environment..... 2

Table 2. Chemical compounds that are amenable to phytoremediation 24

Table 3. Summary of Comparative Analysis of Remediation Methods 32

Table 4. Summary Table of Advanced Air Pollution Control Devices 44

List of Figures

Figure 1. Mercury cycle in aquatic systems..... 4
Figure 2. Stratification of lake aones 8
Figure 3. Biological stratification of lake layers..... 9
Figure 4. Simplified image of an airlift aerator 11
Figure 5. Drawing of conceptual speece cone 12
Figure 6. Bubble plume diffusers, linear (left) and circular (right) 13
Figure 7. Drawing of in situ aqueous cap……. 16
Figure 8. Hydraulic dredging (top), mechanical dredging (bottom)……. 19
Figure 9. Sequence of important environmental oxidants through aerobic and anaerobic pathways 25
Figure 10. Fish consumption advisories and Safe Eating navigation tool..... 45
Figure 11. Approximate serving size of fish for children and adults……46

List of Acronyms and Abbreviations

$Ca(NO_3)_2$	Calcium Nitrate
CH_3^-	Methyl Group
CH_3Hg^+	Methylmercury
CH_4	Methane
CO_2	Carbon Dioxide
DO	Dissolved Oxygen
EPA	Environmental Protection Agency
Fe^{2+}	Ferrous Iron
Fe^{3+}	Ferric Iron
H_2S	Hydrogen Sulfide
Hg^0	Elemental Mercury
Hg^{2+}	Ionic Mercury
HgT	Total Mercury
HOS	Hypolimnetic Oxygenation
HS^-	Hydrogen Sulfide
MATS	Mercury and Air Toxics Standards
MeHg	Methylmercury
Mg/L	Milligram per liter
Mn^{2+}	Manganese
N_2	Nitrogen
NO_3^-	Nitrate
OH^-	Hydroxide
PPM	Parts per million
RCRA	Resource Conservation and Recovery Act
Redox	Reducing-Oxidizing
S^{2-}	Sulfide
SO_4^{2-}	Sulfate
SRB	Sulfate reducing bacteria
ug/g	Micrograms per gram

Abstract

Mercury is an environmental and public health concern due to its neurodegenerative effects and ubiquitous concentration within the environment. To mitigate these risks and reduce concentrations within the environment, remediation methods are necessary. The purpose of this paper is to investigate and evaluate the efficacy of a number of remediation options for mercury contaminated lakes and reservoirs in the State of California. This paper also identifies a number of challenges associated with the implementation of each method and provides recommendations for environmental managers to use when remediating mercury contaminated lakes. Hypolimnetic oxygenation (HOS) was found to be the least problematic remediation method and nitrate additions were found to be the most problematic. Remediation through dredging is only ideal for severely polluted sediments and can be cost prohibitive for many environmental managers. Phytoremediation is not an ideal method either due to lack of non-invasive mercury accumulating plants. Aqueous capping is a viable method, but only if the lake or reservoir is small in size. HOS is the least problematic remediation method investigated in this paper. HOS controls and prevents mercury from being methylated and entering the food web with the added benefit of increasing oxygen levels and cooling benthic temperatures. In order to decrease mercury deposition and mercury concentrations within California lakes, it is recommended that State and Federal legislation be passed to set mercury emission standards to reduce atmospheric deposition and emissions from coal fired power plants. In conjunction with legislative action, it is also recommended that both old and new coal fired power plants be fitted with advanced pollution control technologies to decrease mercury emissions in the United States. There is also the need to prioritize lakes for remediation efforts across the state due to limited environmental funding. Furthermore, it is also recommended to reduce risk of exposure in humans to eat fish lower on the food chain, or to eradicate animal proteins from their diet entirely.

Introduction

Mercury is a global pollutant and a neurotoxin that is both an environmental and public health concern. Increases in anthropogenic activity since the Industrial Revolution have increased the amount of mercury in the environment three-fold (Lamborg et al., 2014). Fossil fuel combustion, gold mining activities, and precious metal processing have released tremendous amounts of this element into the environment. Due to these activities in the State of California, exposures to mercury has increased in both wildlife and humans, causing neurodegenerative effects. In order to mitigate this issue, this research project posits a number of remediation techniques that may be able to alleviate the mercury pollution found in these freshwater lakes and reservoirs in the State of California.

Sources of Mercury

Mercury has both natural and anthropogenic sources. Natural sources of mercury exist in the Earth's crust, volcanic eruptions, forest fires and emissions from the ocean (US EPA 2017). Global mercury emissions from both natural and anthropogenic sources are estimated to be between 2000 and 8000 metric tons annually, with the majority coming from anthropogenic sources (US EPA 2017) (USGS 2017). However, a disproportionate amount of anthropogenic activity contributes to global mercury emissions. The majority of these anthropogenic activities come from indirect sources. This includes: atmospheric emissions, surface deposition from industrial activities, like fossil fuel combustion, production of metals or coal burning for energy consumption (Michael et al. 2016) (US EPA 2017). Direct discharge of inorganic mercury also can come from mining practices, like chlor-alkali plants, or artisanal small-scale gold mining activities (ASGM) (Matthews et al. 2013).

Historic Mercury Pollution from Gold Mining Practices in California

Mining for precious metals, like gold, has contributed significantly to mercury pollution within California. While precious metal mining has generally ceased within the State, their effects upon the environment still remain. California is known for its' rich history of gold mining, which has

led to one of the largest sources of direct mercury contamination to aquatic resources in California. Historically, mercury was used to increase the recovery of gold extraction. Miners would search for placer deposits, which are called alluvial or swath deposits, that are unconsolidated gravel that contains gold (Alpers et al. 2005). In order to extract the gold from these deposits, miners would spray water from high pressure hoses to break up these rock deposits into smaller pieces. Then, the slurry was funneled into a sluice where water and gravel would flow over the top of the screen, and gold pieces would fall through and be collected at the bottom. This extracted large pieces of gold, but was unsuccessful at collecting finer gold flakes. In order to increase gold recovery, hundreds of pounds of liquid mercury were added to the sluice and the mercury would bind to the gold, forming an amalgam. This solid was then collected and heated so the mercury would turn into vapor, leaving the solid gold behind (Gibb et al. 2014).

Unfortunately, this practice was extremely inefficient and mercury leached out into nearby soils, bedrock streams and mine tailings. Approximately 220 million pounds of mercury was produced in California from 1850 to 1981. From this total amount, mercury loss to the environment from hydraulic mining is estimated to be 10 million pounds (Alpers et al. 2005). On average, annual gold mining practices would lose approximately 25 percent of the mercury input into the system (Alpers et al. 2005). Today, hundreds of millions of pounds of mercury are still unaccounted for, and persist within aquatic systems throughout California.

Mercury Speciation

Mercury has many different species that partition into various areas of an ecosystem. (Table 1).

Table 1. Mercury species found in the environment (Lamborg et al. 2014)

Species	Chemical Formula	Note
HgT	HgT	Total Mercury
Hg^0	Hg(0)	Elemental Mercury
Hg^{2+}	Hg(II)	Ionic Mercury
CH_3Hg^+	$MeHg^+$	Methylmercury
CH_3^-	CH_3^-	Methyl Group

Each mercury species is considered an environmental pollutant, with organic mercury arguably the most damaging to the environment and biota. Total mercury, or HgT is commonly used to describe all mercury species within a system. Hg^0 is another species commonly known as elemental mercury (Center for Disease Control 2016). Elemental mercury exists as a liquid metal at room temperature. Elemental mercury can be found in dental amalgams, lightbulbs, and old thermometers (Fitzgerald and Lamborg 2007; Matthews et al. 2013). In the environment, elemental mercury exists in a gaseous form, where it has a long residence time, and globally transported (Fitzgerald and Lamborg 2007). Chronic, low-dose inhalation exposure can cause neurological damage, memory problems, and in high concentrations damage human lungs (CDC 2016).

Hg^{2+} is another form of mercury, commonly called ionic mercury. This is an inorganic form and is the most common species found in the environment (Lamborg et al. 2014). Often it complexes to other ions, forming a compound, like mercury chloride or mercury sulfide (Selin 2009) (Center for Disease Control 2016). These compounds can sometimes be found naturally or used in industrial processes.

Finally, there is the organic molecule CH_3Hg^+, which is monomethylmercury, often shortened to methylmercury ($MeHg^+$). This species of mercury is arguably the most dangerous and potentially has the most significant adverse health effects of all mercury species. Methylmercury is a mercury atom that is bonds to a methyl group. Organic mercury compounds are formed when mercury bonds with carbon, or a carbon based chemical group. A methyl group consists of a carbon atom connected to three hydrogen atoms (CH_3^-) (Ullrich 2007). Methylmercury has the ability to bioaccumulate and biomagnify within food webs causing neurodegenerative effects in wildlife and humans when ingested over time (Bank et al. 2012).

Mercury Cycling in Freshwater Systems

Elemental mercury is emitted into the atmosphere from fossil fuel combustion or natural sources such as forest fires or volcanic eruptions. In the atmosphere, it can oxidize through a number of chemical reactions into ionic mercury (Krabbenhoft and Rickert 2016). Once in its ionic form, it falls to the earth via wet or dry deposition (Selin 2009). It can either fall directly into a body of water, or land on terra firma and then washed into an aquatic system via runoff. Once ionic

mercury enters a body of water, it has three general transformation pathways (Figure 1). It can be reduced back into elemental mercury, and volatilize back into the atmosphere as a gas. The second pathway is its adsorption to sediments which collect at the bottom of lakes, rivers or reservoirs. Finally, ionic mercury can be methylated by sulfate reducing bacteria and converted into methylmercury (Fitzgerald and Lamborg 2007).

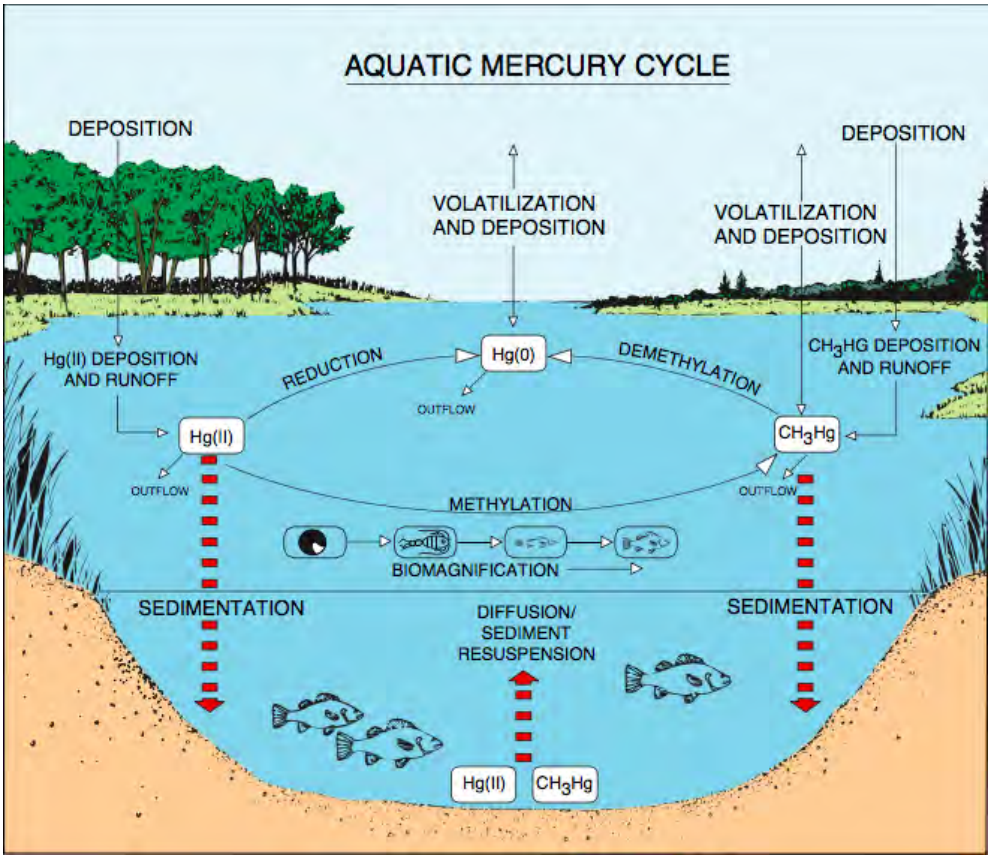


Figure 1. Mercury Cycle in Aquatic Systems (Krabbenhoft and Rickert, 2016)

In order for methylmercury to be formed, certain conditions must be met. Sulfate or iron reducing bacteria that thrive in anaerobic or sub-oxic conditions must be present (Strickman and Mitchell 2017). Anaerobic conditions are commonly found at the bottom of a body of water, near the sediment-water interface. In addition to an oxygen poor environment, high levels of dissolved organic carbon, relatively warm temperatures and low pH levels are required for these microbes to metabolize mercury (Strickman and Mitchell 2017). Once the ionic mercury is

methylated, methylmercury can be ingested by phytoplankton and biomagnify up the food chain and throughout the aquatic food web (Bank et al. 2012).

Mercury transformations in aquatic systems go in both directions. Any of these processes can be reversed, given the right conditions. Thus, there may be multiple forms of mercury in one aquatic system at any given time.

Why is Methylmercury an Environmental and Public Health Concern?

Methylmercury exposure is an environmental concern and public health concern because it has the ability to bioaccumulate and biomagnify up the food chain (Bareket et al. 2016). Bioaccumulation is the process when an organism uptakes a toxin faster than it can be removed from the body; while biomagnification is the increase in concentration of a toxin with an increase in trophic level. Methylmercury enters the food web via direct uptake from phytoplankton in aquatic ecosystems. The methylmercury makes its way up the food chain to zoo plankton, small fish, and then larger fish, resulting in fish tissue concentrations that are estimated to be 10^6 times higher than surrounding water concentrations (Selin 2009; Matthews et al. 2013; Bareket et al. 2016). Tertiary predators in aquatic ecosystems, humans included, are at greatest risk for exposure and most likely to experience negative effects from methylmercury due to its biomagnification (Matulik et al. 2017). Ergo, the main exposure route of methylmercury in people is through consumption of fish high in mercury levels. Globally over 1.5 billion people consume seafood as their main source of animal protein (Driscoll et al. 2013). Pregnant women and children have higher risk of exposure because methylmercury can cross the blood-brain and placental barriers. This can cause developmental and neurological defects in fetuses and young children (Selin 2009; Hinwood et al. 2013).

Aside from women of child bearing age and infants, adult males are also potentially at risk for methylmercury exposure. Recent epidemiological studies surmise that consumption of contaminated seafood in adult males leads to an increased risk of cardiovascular disease (Selin 2009; Driscoll et al. 2013). Cardiovascular disease is one of the leading causes for mortality in developed countries (Driscoll et al. 2013). However, further research is necessary to bolster this finding.

Other disproportionately exposed groups include immigrant communities, indigenous peoples and recreational anglers. Immigrant communities may eat their own catch it its entirety, including tissues or organs other than just the fillets, thereby increasing their exposure to methylmercury (Driscoll et al. 2013). Indigenous peoples may depend more heavily on subsistence fishing and a more restricted diet either due to cultural practices or lack of economic means to afford other foods (Driscoll et al. 2013). While recreational anglers often enjoy eating what they can catch, even if they are not economically disadvantaged. California has a culturally and economically diverse populace, with millions of people potentially at risk for methylmercury exposure.

Not only is methylmercury a public health concern, it is also an environmental pollutant that has deleterious effects on wildlife, especially piscivorous fish. Sub-lethal and lethal effects occur at concentrations between 5-10 μg/g (wet weight) of methylmercury. However, even levels as low as 0.3 μg/g in the entire body of a fish demonstrate negative effects (Driscoll et al. 2013; Scheuhammer et al. 2015). Increased MeHg concentrations in the tissues of fish can compromise reproduction of pregnant females, retard embryonic development, alter biochemical processes and damage tissues or cells within the bodies of fish (Selin 2009; Lamborg et al. 2014; Cheng et al. 2016). The health of fisheries and aquatic ecosystems are threatened by mercury exposure at environmentally relevant concentrations.

Research Objectives:

This paper has a number of research objectives. The first objective is to determine available remediation techniques to reduce mercury, and methylmercury pollution within freshwater lakes and reservoirs within the State of California. I evaluated these techniques for their efficacy at controlling or removing mercury from a freshwater system. Finally, this paper aims to determine the challenges environmental managers and policy makers will need to overcome in order to reduce mercury pollution within lakes and reservoirs in the State of California. In addition to these objectives, I developed recommendations from the literature to control mercury in the future, both locally and globally.

Methods

In order to achieve my research objectives, I conducted a literature review. I focused my literature review on scientifically peer reviewed journal articles, government reports, and book chapters. I investigated remediation strategies for mercury-contaminated sediments, specifically in lakes and drinking water reservoirs within the State of California. I also evaluated and compared remediation strategies and their potentially efficacy to either prevent, or remove mercury from aquatic systems. In addition to my primary literature review, I developed management strategies and recommendations related to prevention and removal of methylmercury from aquatic resources in California.

The following criteria are used to analyze each remediation method:

1. Type of Treatment
2. Cost (If applicable)
3. Level of Contamination
4. Time Scale to Decontamination/Mercury Control
5. Appropriate for California
6. Advantages
7. Disadvantages

In Situ Aeration and Oxygenation

Lake Stratification

In order for methylation of mercury to occur, anaerobic conditions must be present. In both the summer and winter seasons, lakes and reservoirs are stratified by temperature, creating distinct layers. This stratification allows for oxygen to diffuse into the top layers of a lake, but oxygen cannot diffuse into the bottom of a lake. In situ aeration and oxygenation is a remediation method to deliver oxygen to the bottom of lakes or reservoirs to prevent the methylation of mercury by sulfate reducing bacteria.

In both the summer and winter months, lakes and reservoirs on the West Coast of the United States will stratify into distinct layers, with summer lake stratification the most

pronounced, assuming no strong winds are present. Warm air temperatures heat the surface of the lake, and prevent the warm water from sinking and mixing with deeper layers. The stratification of a lake however, depends on its depth, size and shape. Deeper lakes will show clear separation of layers and small lakes may never stratify due to warm temperatures throughout and constant wind movement.

There are three common layers within lakes and reservoirs: epilimnion, metalimnion, and hypolimnion (Figure 2, Queensland Government 2017). The epilimnion is the top layer of a lake that is influenced by solar radiation and wind. This layer is relatively warm due to the proximity to solar radiation and therefore a lower density than deeper, colder water, causing it to remain on the surface. The middle layer is called the metalimnion with a rapid change in temperature. This layer divides the epilimnion and hypolimnion and contains the thermocline. In the summer months, the thermocline acts like a barrier and prevents the two layers from mixing by wind action. The deepest layer is the hypolimnion. This layer is cold, dense, dark and usually undisturbed, relative to the other two layers.

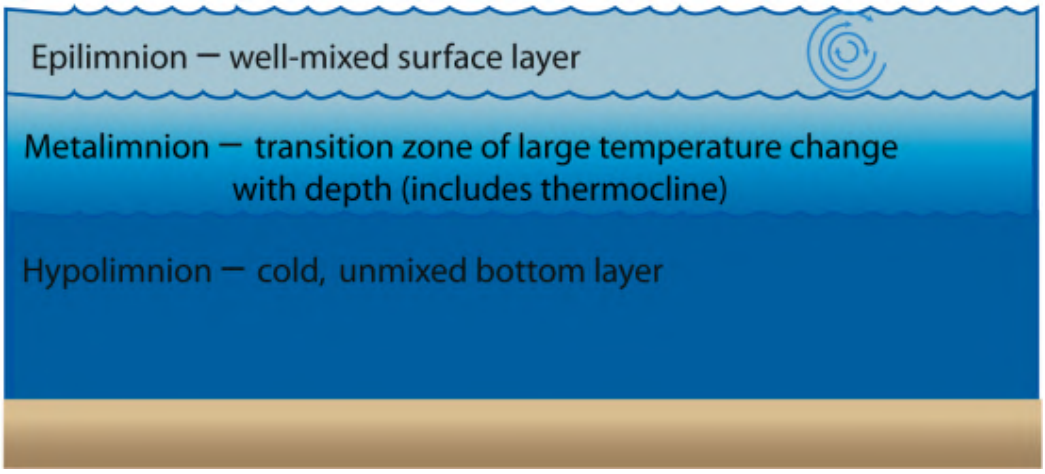


Figure 2. Stratification of Lake Zones (Queensland Government 2017)

A lake can also be classified distribution and its assemblage of biota, not only changes in temperature. The near shore section of a lake is the littoral zone, which is shallow and light can easily penetrate the bottom sediments (Figure 3, Illinois EPA 2017). Vegetation is abundant in this zone. The limnetic zone is an area of open, offshore water, next to the littoral zone. This zone is exposed to sunlight near the surface resulting in a high abundance of phytoplankton. The

profundal zone is the deepest zone with little to no biological activity, or access to light. Many sportfish species, like bass or perch live here (Whittier et al. 2001). Aquatic sediments that comprise the bottom of a lake or reservoirs are often called the benthic zone. Bottom dwelling organisms, like small crustaceans, mollusks and invertebrates reside here (Whittier et al. 2001). Often this layer has minimal plant life, due to the lack of sunlight.

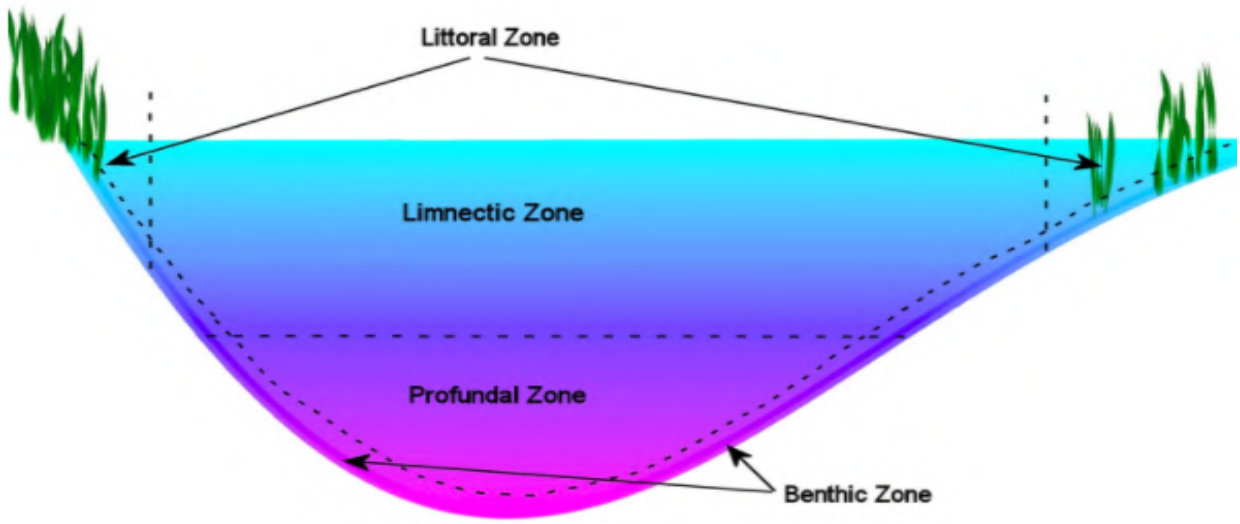


Figure 3. Biological stratification of lake layers (Illinois Environmental Protection Agency 2017)

Oxygen Availability in Lakes and Reservoirs

Oxygen concentrations within a lake are varied. This is due to the ability of gaseous oxygen to reach each distinct layer. Oxygen usually enters lakes in three ways, through atmospheric diffusion, photosynthetic action of plants and from inflow of streams depositing oxygen into the lake. The epilimnion has an abundance of oxygen from atmospheric diffusion, but the hypolimnion does not. The metalimnion acts like a barrier, preventing oxygen from diffusing into the hypolimnion. Since the hypolimnion is relatively deep, little solar radiation reaches this layer and oxygen production of photosynthesis does not occur. Any oxygen that reaches the hypolimnion is consumed by anaerobic bacteria and other microbes in the benthos until no oxygen remains.

High oxygen levels in lakes are imperative for the survival of cold water fish species and the prevention of eutrophication. Oxygen found in minimal levels (<2 mg/L) in a lake can be considered hypoxic, and depleted oxygen levels (0 mg/L) are considered anoxic (Beutel et al.

2014; McCord et al. 2016). The lack of oxygen in the hypolimnion creates conditions conducive for anaerobic, and sulfate reducing bacteria to convert inorganic mercury into methylmercury. The hypolimnion must be oxygenated to inhibit methylmercury production as will be discussed in the next section.

What is Hypolimnetic Oxygenation?

Hypolimnetic oxygenation (HOS) is an *in-situ* remediation method that increases oxygen levels found within the hypolimnion of lakes and reservoirs. Implementing this method increases dissolved oxygen (DO) levels in order to decrease methylmercury production in the hypolimnion and hopefully lower methylmercury bioaccumulation in fish. The process of HOS requires anoxic ambient water to be collected into a device, mixed with gaseous oxygen or ambient air, and then released back into the hypolimnion. HOS systems are often designed to meet the specific oxygen needs of the biota in each lake, however targeted DO levels are approximately 5 mg/L (McCord et al., 2016). HOS systems come in a variety of configurations, which can be suspended within the hypolimnion, or rest on the bottom of the lake at the sediment water interface (Beutel and Horne, 1999).

How Does Hypolimnetic Oxygenation Inhibit Methylmercury Production?

Oxygenation of benthic sediments and the hypolimnion may prevent the production of methylmercury through a variety of mechanisms. Sulfate reducing bacteria reduce sulfate (SO_4^{2-}) during their metabolic processes of breaking down carbon. This activity converts sulfate into sulfide (S^{2-}). Sulfate reducing bacteria (SRB) do not thrive in oxygenated waters. Therefore, the more oxygenated the water is, the fewer SRB's present. The methylation zone moves deeper into benthic sediments where the hypolimnion is oxygenated and makes it difficult for methylmercury to diffuse upwards and become bioavailable. If conversion of methylmercury is reduced or prevented, less of it will enter the food web and become a threat to tertiary biota and people. Oxic conditions promote the growth of aerobic bacteria that do not rely on the uptake of mercury or methylation of mercury as part of their biological processes.

Hypolimnetic Oxygenation Devices and Systems

Multiple types of HOS systems exist, the most common of which are either aeration or oxygenation. Examples of these systems include: airlift aerators, speece cones, and bubble plume diffusers. Airlift aerator systems pipe in ambient air or oxygen gas and expose it to lake water in a contact chamber (Figure 4 Chowdhury et al. 2014). Compressed air is pumped into the bottom of a vertical contact chamber, where it is mixed with hypolimnetic waters. Due to its positive buoyancy, the mixture rises through the contact chamber allowing air to diffuse into the water. In the separator box, the air can be off gassed and released into the atmosphere, while the newly aerated water is piped back down past the thermocline and deposited into the hypolimnion (Singleton and Little 2006).

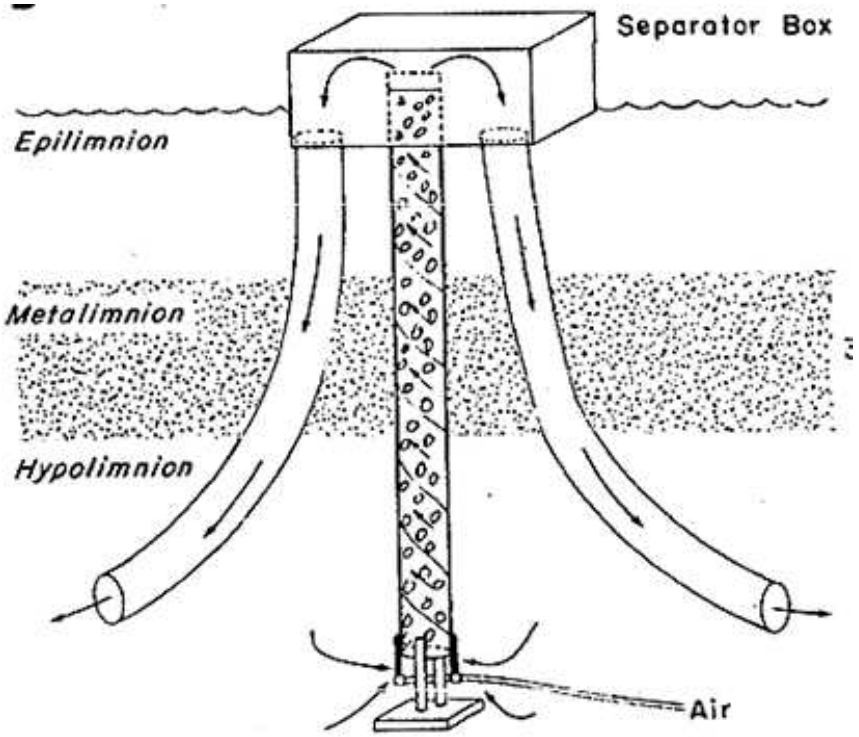


Figure 4. Simplified image of an airlift aerator (Chowdhury et al. 2014)

Another effective oxygenation method is to use a speece cone, originally known as a submerged down flow bubble contactor. This system consists of a conical holding tank, oxygen gas input, source of water and a diffuser, which releases oxygenated water into the hypolimnion (Singleton and Little 2006). Water is sucked into the device through an intake valve where it is pumped into the top of the cone. Here oxygen gas is pumped in and introduced at the neck of the

cone (Figure 5, Chortek 2017). The down flow of the water is stronger than that of the positively buoyant oxygen gas, preventing any gas from escaping and forcing mixing to occur. As the water flows down the sides of the cone, the flow rate slows, and the oxygen bubbles get smaller until they are fully diffused into the water. The oxygenated water is then released at the bottom of the cone through a diffuser back into the hypolimnion (Singleton and Little 2006).

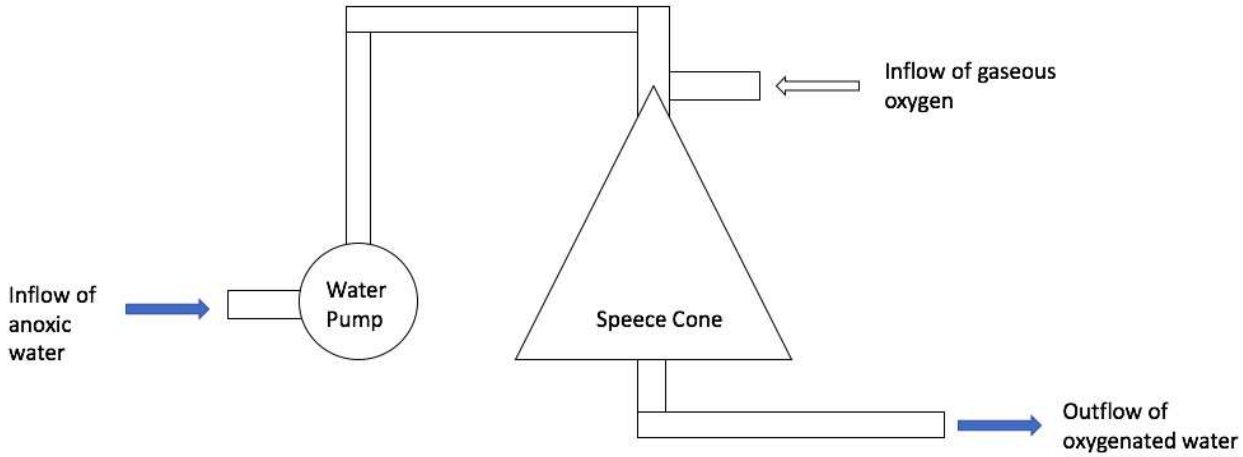


Figure 5. Drawing of conceptual speece cone (Chortek 2017)

Bubble plume diffusers can also be used to oxygenate the hypolimnion. Bubble plume diffusers consists of tubing with small holes where gas can escape into surrounding waters (Figure 6, Singleton and Little 2006). Bubble plume diffusers can either be circular or linear and can use either ambient air or oxygen gas. Gas flows slowly through the bubble plume diffusers and are ideal for deep lakes where the majority of bubbles will dissolve in the hypolimnion. This method does not disrupt the thermocline because the oxygenated water will float up until it is neutrally buoyant in the hypolimnion, and then flow horizontally outwards (Singleton and Little 2006). Disruption of the thermocline is possible with the other two devices (speece cone and airlift aerator) if managed improperly.



Figure 6. Bubble plume diffusers, linear (left) and circular (right) (Singleton and Little 2006)

Biological and Chemical Benefits of Maintaining an Aerobic Hypolimnion

The most favorable outcome of increasing oxygen within the hypolimnion is the fact that higher DO levels (≥5 mg/L) will limit the amount of mercury released into the reservoir. Oxic conditions do not favor the growth of sulfate-reducing bacteria. This means that other genera of bacteria, like denitrifying bacteria, will be dominant during these conditions. They do not methylate mercury as part of their biological processes.

There are a variety of biological and chemical benefits to maintaining an aerobic hypolimnion. Oxygenating the hypolimnion keeps all lake layers separated, and helps the profundal zone to remain cold. Keeping the hypolimnion layer cool provides necessary habitat for sportfish, like bass, and is also essential for other downstream biota, especially in the warm summer months. The cool profundal zone provides a refuge for zooplankton during the day in order to avoid predation (Beutel and Horne 1999).

In addition to biological benefits, maintaining an oxic hypolimnion also prevents the release of problematic chemical compounds that are usually adsorbed by sediments. Compounds can include iron (Fe^{2+}), manganese (Mn^{2+}), and sulfide (S^{2-}). These chemicals degrade the aesthetic quality and taste of drinking water. They also play a role in the methylation and release of mercury in an aquatic system (Beutel and Horne 1999). Maintaining an oxygenated hypolimnion also keeps iron and manganese oxides within surface sediments, slowing and sometimes preventing upward diffusion of methylmercury. These act as a sorption barrier to

upwardly diffusing methylmercury within benthic sediments (McCord et al. 2016). Most mercury is methylated within the upper most 10 centimeters of sediment, sometimes even within the top 3 centimeters (Ndungu et al 2016). A combination of an oxygenated hypolimnion and presence of iron and manganese ions further prevents methylmercury from entering ambient waters. The presence of iron and manganese and their compounds, in aquatic sediments may cause methylmercury to bind to these metals instead of being released into ambient waters.

Maintaining oxic conditions helps decrease the occurrence of eutrophication and decreases the release of ortho-P and ammonia from microorganisms. Orthophosphate (Ortho-P) and ammonia are unfavorable compounds that can be released during anoxic lake conditions (Beutel and Horne 1999). Ortho-P is a species of phosphate that is reactive within environmental systems, and when released can cause eutrophication since phosphorous is a limiting nutrient in California.

It is important to maintain oxic conditions in order to avoid this problem and avoid methylmercury conversion. Too much sulfide residing in hypolimnetic waters is problematic. During fall turnover, when lake layers completely mix, sulfide that was stored in the bottom of the lake is brought to the surface and the water column temperature mixes and becomes homogenous. This frees up the sulfide and hydrogen in the water and forms hydrogen sulfide (H_2S) due to the lack of oxygen and abundance of hydrogen. Hydrogen sulfide is a toxic gas that can cause fish kills. At moderate levels, sulfide can enhance the bioavailability of ionic mercury for methylation (McCord et al. 2016). Reducing sulfide concentrations in reservoirs will decrease mercury's bioavailability which in turn will reduce the amount of mercury phytoplankton uptake and decrease the amount of mercury entering into the food web.

Benefits of Implementing Hypolimnetic Oxygenation

Hypolimnetic oxygenation has been an effective method to control the release of methylmercury within four lakes in the Guadalupe River Watershed, San Jose. The four lakes are: Stevens Creek Reservoir, Guadalupe Reservoir, Calero Reservoir and Almaden Reservoir. The Guadalupe River Watershed is a complex hydrologic system that is contaminated by the New Almaden mercury mine, the largest mercury producer in North America (McCord et al. 2016). The installation and use of an HOS system in these lakes is to reduce hypolimnetic methylmercury

concentrations and thereby reduce mercury concentrations in biota. HOS systems delivered 5 mg/L of pure oxygen gas to the hypolimnion during the summer months of operation. With this system in place, Calero Reservoir mercury levels decreased to 1.5 ng/L (McCord et al. 2016). Results for the three other lakes are still being calculated.

Implementing HOS systems into a mercury contaminated lake yields some energy and monetary benefits. HOS systems are run during spring and summer months, when thermal stratification is most pronounced. During the cooler winter months, mercury methylation is not as prolific and lakes are not as biologically active. This means that HOS devices do not need to be run year-round, only 6-8 months out of the year. Thus, decreasing energy requirements, decreasing costs and potential emissions from energy use are all benefits of HOS installation.

The efficiency of an HOS system can be increased by substituting compressed air for pure oxygen gas. By using pure oxygen gas, rather than ambient air, profundal waters are better oxygenated. Injections of pure oxygen gas can deliver 60-80% more dissolved oxygen than ambient air (Beutel and Horne 1999) (Ashley et al. 2014). By using pure oxygen gas, rather than ambient air, profundal waters are better oxygenated. Using ambient air, which is comprised of about 70% nitrogen, may cause bottom waters to be supersaturated with nitrogen gas and further exacerbate anoxic conditions (Beutel and Horne 1999).

Challenges of Implementing Hypolimnetic Oxygenation

There are a number of challenges that need to be overcome when implementing hypolimnetic oxygenation systems in anoxic lakes and reservoirs, including timing and initial oxygen levels. HOS systems are designed to meet oxygen demand, not overcome a deficit. Thus, it is imperative that HOS systems are initiated before hypoxic conditions set in. HOS systems are designed to deliver a set amount of oxygen and keep ambient waters at a particular level, not to overcome excess biological or chemical oxygen demand within a reservoir (McCord et al. 2016). Ideally, these systems would be installed and running in the spring, but no later than the beginning of summer when thermal stratification begins and oxygen levels at the profundal zone begin to decline.

Ideally, HOS systems should be installed in the benthic zone or on the sediment-water interface. Installing HOS devices in the profundal zone allows for small hypoxic gaps to develop, even if the rest of the hypolimnion is well mixed due to the upward lift of bubble plumes

(McCord et al. 2016). Lateral diffusion should also be incorporated into future HOS designs of aeration devices, in order to minimize potential hypoxic gaps and areas for further mercury methylation.

Another challenge with HOS is the potential for increased turbulence between lake layers. Excess turbulence and destratification of layers potentially releases methylmercury from the hypolimnion into the epilimnion, allowing it to become bioavailable. There should be a balance between oxygen delivery and induced turbulence. A high flow of gas, and higher rate of diffusion from an HOS device increases oxygen levels within the hypolimnion. This increased flow rate also increases turbulence between the hypolimnion and the rest of the layers in the lake (McCord et al. 2016). Too much turbulence may erode the thermocline mixing all layers within the lake. This mixing increase temperatures throughout the lake and may release mercury into upper layers of the lake where it is more accessible to biota. High diffusion rates may increase oxygen levels in the reservoir, but increase mercury exposure in biota, rendering this technique ineffective at mitigation of both aqueous mercury concentrations and mercury uptake in phytoplankton.

In Situ Aqueous Capping

Contaminated sediments can be immobilized and isolated via in situ aqueous capping (Figure 7 Chortek 2017; Randall and Chattopadhyay 2013). Capping is a well-tested method and can be an effective remediation option. Contaminants are covered from ambient waters by the cap, thereby decreasing the risk of release into upper waters. An aqueous cap provides a complete seal between the aquatic environment and contaminated sediment. A chemically active cap also provides sorption or chemical isolation of dissolved metals, like activated carbon (Randall and Chattopadhyay 2013). Physical, and sometimes chemically reactive barriers are placed on a site to contain contaminated soils in place (EPA 2017). Physical barriers prevent the movement of benthic organisms, namely invertebrates, and prevent predators from consuming these contaminated organisms, thereby preventing bioaccumulation of mercury in the food chain (Cassidy et al. 2002). Both chemical and physical caps can stabilize the benthic sediments and prevent erosion. Barriers that are used can be natural or man-made and they can be comprised of sand, gravel, clean sediment or man-made layers, like geotextiles (EPA 2017). Geotextiles are

permeable material used for soil stability commonly made from polypropylene or polyester (Mizkowska et al. 2017). They are included in caps to make them more effective.

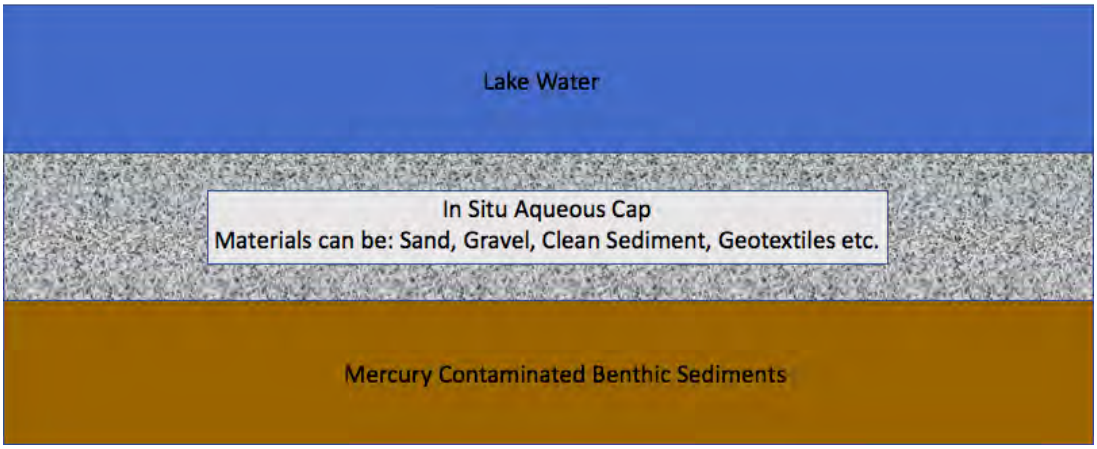


Figure 7. Drawing of an in situ aqueous cap (Chortek 2017)

To evaluate the effectiveness of a physical cap and biointrusion prevention, researchers from Western Michigan University conducted a number of experiments in 2002 in the Great Lakes Drainage Basin. An in situ aqueous cap was placed in Gull Creek, Michigan, in order to control the bioaccumulation of mercury by stopping biointrosion and erosion (Cassidy et al. 2002). This method prevents the vertical movement of benthic organisms, and prevents fish from feeding in contaminated sediments, thereby decreasing erosion and bioaccumulation of mercury. A geotextile layer was placed on top of contaminated sediments with an additional 3 cm of sand and pea gravel to hold the cap in place (Cassidy et al. 2002). At the end of the seven-month experiment, approximately 4.26 ± 2.47% of benthic organisms were able to pass through the cap, demonstrating a successful means to control biointrusion and mercury bioaccumulation via aqueous capping (Cassidy et al. 2002).

Benefits of Implementing In-Situ Aqueous Capping

If the remediation site is small and shallow in depth, aqueous capping is much more cost effective than in situ dredging and disposal. In addition, in situ aqueous capping also has the added benefit of low environmental impacts. This method causes minimal disturbance to existing ecosystems, minimizes transport of contaminated sediments and lowers the risk of resuspension of contaminated sediments (Wang et al. 2004). Capping stabilizes sediment, decreases erosion

and transport of contaminated sediment and is most effective when movement of hydrologic flows are minimal (EPA 2017). In-situ aqueous capping would be ideal for a lake or reservoir that has minimal disturbances from human activities and low winds.

Capping and its materials, have the added benefit of passively sorbing other problematic heavy metals, besides mercury. Contaminated sites often have concentrations of heavy metals including but not limited to: lead, chromium, arsenic, zinc, cadmium and copper (Wuana & Okieimen 2011). Depending on the materials the cap is comprised of, heavy metals can be stabilized and removed from surrounding water. Common capping materials include clean sediment, clay, cement and zeolites (Wuana & Okieimen 2011). Each material used has a different immobilization mechanism, whether that is chemical adsorption, precipitation or formation of more stable complexes which prevent heavy metals from being released from beneath the cap.

Challenges to Implementing In-Situ Aqueous Capping

The main challenge of in situ aqueous capping is that it does not remove mercury species from the contaminated site. It is designed to isolate and immobilize mercury from coming into contact with ambient water and biota, not remove it from a system. Capping may reduce the amount of mercury that is available for uptake, but it does not remove mercury from an aquatic system.

The in situ aqueous capping method is appropriate for sites with low hydrodynamic flows, like lakes, reservoirs and bays (Wang et al. 2004). Sites with strong groundwater flow, tides, storms, wind, shipping etc. may scour the cap and rerelease the contaminated sediment (Wang et al. 2014) (Randall and Chattopadhyay 2013). Proper evaluation of environmental factors is critical before installing a cap, to insure the cap will be effective. Even with ideal site conditions and the ability to sorb additional problematic heavy metals, ongoing monitoring of in situ aqueous caps is necessary. This is to ensure the remediation activities are effective and further action is not needed.

One big drawback to in situ aqueous capping is that mercury may continue to be methylated under the cap if organic matter is available. Methylation occurs mostly in the upper 15 centimeters of benthic sediments. To be highly effective, the cap should be greater than 10 centimeters. This can physically prevent mercury from passing through the cap and potentially

allow methylmercury to sorb to materials within the cap, further preventing it from reaching ambient waters (Randall and Chattopadhyay 2013; Ndungu et al 2016). High organic matter content in the cap can also provide conditions ideal for SRBs (Ndungu et al. 2016). To avoid this, the in-situ cap should be comprised of low organic matter to decrease the potential of methylmercury formation (Ngungu et al. 2016).

In addition to low organic content, the cap must be sufficiently thick and include sorptive materials. Puncturing of a cap is only an issue if the cap itself is thin. Caps can be compromised by hydrological flow or biologic activity. Benthic organisms also create holes in the cap due to their activities (Wang et al. 2014). Therefore, it is important to make sure the cap is sufficiently thick and includes sorptive materials to minimize the amount of mercury that may be released into the ambient water. Geotextiles with activated carbon in them are an ideal choice for capping due to their ability to sorb mercury to these materials (Ndungu et al. 2010).

In-situ aqueous caps may not be an effective remediation method in all cases. The cost to place an in-situ cap can be very expensive for large scale sites (greater than 1000 acres). Installation itself can cost $\$25/m^2$. This does not include the cost of the materials themselves (Randall and Chattopadhyay 2013). Total capping costs on average are estimated to be $600,000 (Henry 2000).

In Situ Dredging

Dredging is an in-situ remediation method that removes contaminated sediments from a site. There are two types of dredging: mechanical and hydraulic. Mechanical dredging is the removal of sediment by scooping or digging with a clamshell bucket (Figure 7; Randall and Chattopadhyay 2013; EPA 2017). This method is ideal for sediments that are hard, dense, or clay like. Hydraulic dredging is the removal of a liquid slurry that is comprised of a mixture of water and sediment (EPA 2017). This method is ideal for sediments comprised of finely grained materials. The slurry is suctioned up and out of the site. Once on land, the water has to be removed from the collected sediments, also called dewatering. If contaminated, the water must be treated and then the disposed sediments are transported off site and then either decontaminated or buried.

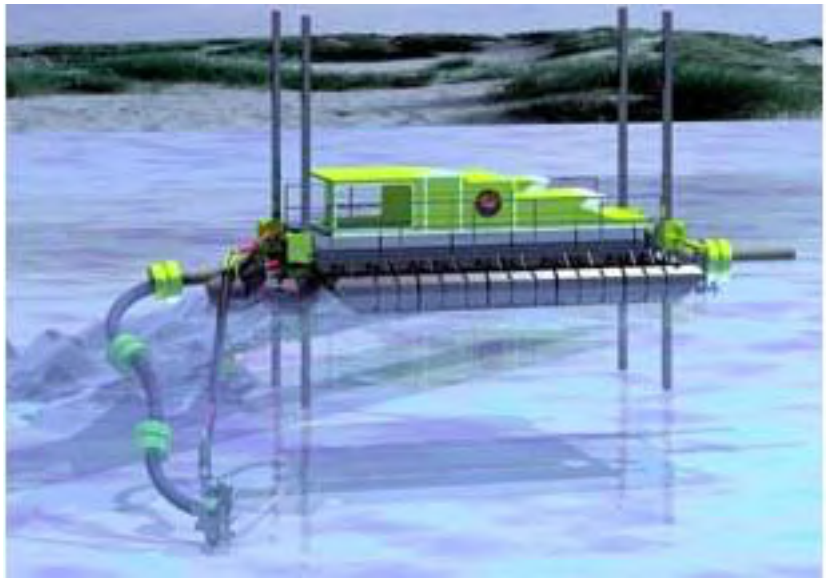




Figure 8. Hydraulic dredging (top), mechanical dredging (bottom) (Torres et al. 2014; Clearwater.org 2017)

Benefits Associated with In Situ Dredging

One of the greatest advantages of dredging compared to the other remediation methods is that it can remediate large amounts of contaminated sediments. Dredging might be ideal for contaminated sites that are large in size, or have high concentrations of a contaminant (Wang et

al. 2014). A site in Minamata Bay, Japan, used dredging as a remediation technique successfully. Inorganic and methylmercury were released directly into Minamata Bay as byproduct from the production of acetaldehyde from 1932 to 1968 in a nearby chlor-alkali plant (Akito et al. 2014). What ensued in years after were severe cases of mercury poisoning, and eventual diagnosis of Minamata disease in the mid 1950s due to the consumption of contaminated seafood. To minimize the risk of exposure to mercury, Minamata Bay and its bottom sediments were hydraulically dredged from 1977-1990. Mercury sediment concentrations ranged from 0.04 ppm to 553 ppm before dredging began (Akito et al. 2014). After dredging was completed, average mercury sediment concentrations were estimated to be 0.06-16 ppm (Akito et al. 2014). In this case, dredging was an effective way to quickly remove severely contaminated sediments and drastically improve both sediment and water quality within Minamata Bay. Dredging contaminated sediments within California lakes or reservoirs would be ideal if there is evidence of very high mercury concentrations, or if a large number of subsistence fishing populations were at risk of exposure.

There are also a number of other benefits associated with hydraulic and mechanical dredging. Hydraulic dredging is ideal for narrow water bodies and can be used in shallow waters ($\leq$ 9 m), making this method versatile and can increase accessibility to contaminated sites (Ragnarsson et al. 2015). It also has the added benefit of easily removing sand, silt and fine pore sediments, which are often found as benthic media in lakes. In contrast to the removal of fine grain sediments, mechanical dredging is ideal to remove rocky or coarse debris from lakes (Randall and Chattopadhyay 2013). In addition to easy removal of sediments, hydraulic dredging is also less likely to suspend contaminated sediments. The strong pump and hose mechanisms act like a vacuum, efficiently removing sediments from the lake bottom. Both dredging methods are efficient at removing unwanted contaminated sediments from freshwater systems.

Challenges Associated with In Situ Dredging

The in-situ dredging poses many challenges as a remediation method for mercury. It is expensive and the disposal process can take a long time. Disposal sites may leak and release the contaminant, trading one cleanup site for another. This method removes contaminated sediment, cleans up one site, and then raises the issue of where to dispose or contain contaminated

sediments once removed. There is also the potential for leakage and contamination of the storage site if proper precautions are not taken.

There is also a high risk for resuspension of sediments when sediment is being dredged. Dredging causes high disturbances to the aquatic environment. This could release mercury in the upper layers of a lake, exposing biota to methylmercury. Mercury could be transported downstream through outlet streams or enter into groundwater (Want et al. 2004). Dredging activities should be slow to minimize the disturbance of sediment. If dredging activities are not slow, this remediation strategy may increase turbidity of the water, which can inhibit photosynthetic activity of plants and increase water temperatures if severe enough.

Dredging can also cause oxidation of anoxic sediments, releasing contaminants that were sorbed to sediments (Wang et al. 2014). This temporarily increases conditions that cause the release of sulfate and organic matter, which favors methylmercury production (Wang et al. 2014). Therefore, dredging activities should be monitored both during active dredging, and post dredging to prevent the release of problematic compounds.

Both mechanical and hydraulic dredging can be an expensive method of mercury remediation, as specialized equipment is required for both types of dredging operations (Wang et al. 2014). Mechanical dredging requires a trained operator, clamshell bucket and arm, and barge or platform for the machine to sit on while it is excavating sediments. Hydraulic dredging also requires a trained operator, suction arm to uptake sediments, pump and tubing to carry sediments to the dewatering site.

In addition to equipment costs, physical transport and removal of sediments can be costly. Excavation of sediments can cost up to $\$1409/m^3$ (Wang et al. 2014). This can be costly if there is a large volume to remove and clean. After dredging a site, future monitoring is necessary to verify an acceptable amount of the contaminant has been removed. Monitoring, while necessary, adds an additional cost to an already expensive project. In situ dredging removes mercury that is deposited via atmospheric deposition or point source pollution. It does not reduce the sources of atmospheric mercury and its exorbitant cost makes this remediation method cost-prohibitive if dealing with low contamination, or small-scale sites.

Phytoremediation

Phytoremediation is a method that uses plants to uptake heavy metals, like mercury, to reduce contamination of ecological sites (Henry 2000). Phytoremediation permanently removes mercury from the surrounding environment and stores it in adjacent plant biomass. Ideally, the plant species used would extract high concentrations of heavy metals into their roots and produce a large quantity of plant biomass (Henry 2000). The plant species used must have the ability to tolerate high levels of mercury in their system. The efficacy of this treatment method depends on the concentration of the contaminant, contaminant species of mercury, the dispersal of mercury within the environment and timeframe for a site to be cleaned up.

A pilot scale laboratory experiment conducted by Marrugo-Negrete et al. (2017) demonstrated the effectiveness of using yellow velvetleaf (*Limnocharis flava*) as a cost effective and easy way to remediate gold mine effluent and mercury contaminated water and sediments. Over a thirty-test day period it was recorded that the removal rate of mercury was based on exposure time. The longer the plants were exposed to contaminated media, the more mercury was removed, with up to 90% of the mercury present sequestered in the plant biomass (Marrugo-Negrete et al. 2017). The results from this study are indicative of the yellow velvet leaf as a mercury accumulator and species capable of remediation mercury contaminated water and sediments.

Benefits of Implementing Phytoremediation

There are a number of benefits to implementing in situ phytoremediation as a way to control the release of mercury in the environment. One major advantage to implementing phytoremediation is that it is a non-invasive strategy like nitrate additions or HOS. Unlike capping or dredging, phytoremediation does not cause sediment resuspension or disturbance of contaminated soils. This further minimizes the risk of mercury release into the water column, and subsequent uptake into phytoplankton and bioaccumulation. Sites that are ideal for phytoremediation include ecologically sensitive sites, with low mercury concentrations.

Phytoremediation is an easy method to implement. It does not require specialized heavy equipment or personnel, unlike capping or dredging activities. The average citizen is capable of

planting or transplanting the appropriate species on the site, however they must wear personal protective gear.

This ease of implementation also translates into a reduced cost compared to capping, dredging and off-site storage. One acre of contaminated sandy loam, (50 cm in depth) is estimated to cost between $60,000 and $100,000 to treat with phytoremediation versus $400,000 to dredge and dispose of the same quantity (Henry 2000). In addition to reduced monetary costs, in situ phytoremediation also decreases the amount of waste that has to be disposed of at hazardous waste landfills by ninety five percent (Henry 2000). This significantly reduces the cost of a phytoremediation project, especially since mercury contaminated soils are considered hazardous waste by RCRA (Henry 2000).

In situ phytoremediation may help sequester other heavy metals or problematic contaminants. This method can be used for a number of chemical compounds, including but not limited to chlorinated solvents, pesticides, cadmium, lead and chromium (Table 3 Henry 2000). *Juncus maritumus,* commonly known as a sea rush, has a high capacity to uptake mercury in sediments (Randall and Chattopadhyay 2013). More research is needed to see if multiple compounds can be sequestered by these species, and how quickly sequestration occurs.

Table 2. Chemical compounds that are amenable to phytoremediation (Henry 2000)

Organics	**Inorganics**
Chlorinated Solvents TCE, PCE, MTBE, carbon, tetrachloride	Metals B, Cd, Co, Cr, Cu, Hg, Ni, Pb, Zn
Explosives TNT, DNT, RDX, and other nitroaromatics	Radionuclides Cs, ^{3}H, Sr, U
Pesticides atrazine, bentazon, and other chlorinated and nitroaromatic chemicals	Others As, Na, NO_3, NH_4, PO_4, perchlorate (ClO_4)
Wood Preserving Chemicals PCP and other PAH's	

Challenges of Implementing Phytoremediation

Phytoremediation has some serious challenges that must be overcome when considering this method for the decontamination of mercury. Phytoremediation is a slow process and can take years or decades to effectively remove mercury contamination from lakes. Furthermore, there are a limited number of plant species that can tolerate the uptake of mercury, like *Juncus maritumus* or hyacinth species, many of which are invasive (Skinner et al. 2007). More research is necessary to identify a larger number of plant species that tolerate mercury uptake, native to the region of California and that uptake mercury quickly.

There may be unintended consequences of the plant species affecting local biodiversity. Not all contaminated sites are suitable for the plants used in phytoremediation. The introduction of non-native or invasive plants may unfavorably alter local ecological community structure and food webs. There is also the concern that non-native plants may not have the appropriate adaptations to local climate. This may affect the production of plant biomass. The lower the biomass that is produced, the less mercury, or other heavy metals that will be removed from the contaminated lake (Henry 2000). Phytoremediation is also limited to the rooting depth of the plants. Mercury can only be removed as far as a plant's rooting system extends. This is not ideal if a site has deep contamination.

There is a concern that if the plants successfully sequester mercury, herbivorous animals may ingest the toxic plant biomass and expose themselves to mercury. Further research is necessary to see if this phenomenon is of biological concern. This may accidentally introduce more mercury into the food web, rendering phytoremediation possibly counterproductive.

What happens to the mercury when the plants die off? Plants that sequester heavy metals, mercury included, have a limited life span. Once they die, they are then considered hazardous waste and need to be removed and contained properly by RCRA standards (Henry 2000). If phytoremediation is going to be an effective method of remediation, these plants must be harvested before they completely decompose and rerelease the sequestered mercury back into the environment.

Chemical Additions

Chemical additions to lakes are a fairly new approach to control mercury concentrations in contaminated sites. These additions of chemicals, like calcium nitrate solution, rely on manipulating reducing-oxidizing conditions within a lake to prevent the methylation of mercury. There are a number of hypothesis as to how this is exactly done. The three-main hypothesis are that nitrate additions alter the methylation and demethylation rate in aquatic systems. The second posits promotes the growth of denitrifying bacteria, that outcompete sulfate reducing bacteria. And the last mechanism suggests that the addition of nitrate increases methylmercury sorption to iron and manganese oxyhydroxides, rendering the mercury unavailable to uptake by phytoplankton due to the amalgams physical size.

Environmentally Relevant Reducing-Oxidizing (Redox) Conditions

Nitrate additions depend on manipulating aquatic redox reactions to prevent the methylation of mercury. Depending on abiotic conditions within an aquatic system, microorganisms will consume compounds during their metabolic processes (Figure 7 Baker et al. 2000). Redox reactions are a type of chemical reaction that involve the transfer of electrons. These reactions always occur in pairs, in which one substance is oxidized, and the other substance is simultaneously reduced. The process of oxidation is described as the loss of electrons (Baker et al. 2000), whereas the process of reduction is the gaining of electrons (Baker et al. 2000). Oxidized chemical forms are represented in a circle in Figure 7 while reduced chemical forms are represented in a diamond.

During metabolic processes, microbes will actively consume compounds that have a high free energy charge. Microbes will select the next most energetic oxidant in the sequence (if oxygen is depleted) to metabolize organic matter via aerobic respiration (Figure 7 Baker et al. 2000). Oxygen is the first compound to be consumed during a redox reaction because it has a high free energy change and is a strong oxidizing agent (Baker et al. 2000). Once oxygen is depleted in the benthic layer of a lake, anaerobic microbes outcompete aerobic microbes due to lack of oxygen. They first consume nitrate, then iron, then sulfate, and finally methane in that order (Figure 7 Baker et al. 2000).

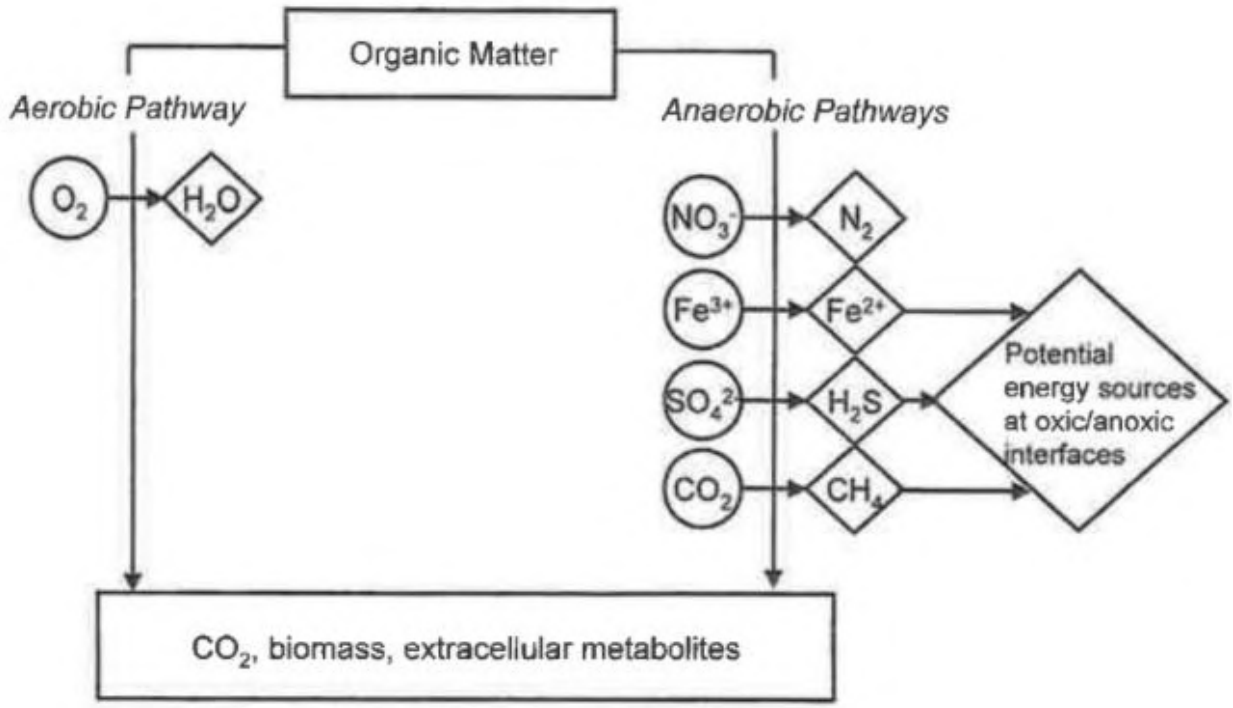


Figure 9. Sequence of important environmental oxidants through aerobic and anaerobic pathways (Baker et al. 2000)

Once the oxygen has been consumed at the sediment water interface, and becomes sub-oxic, other chemical compounds are oxidized for microbial metabolic processes. Each subsequent compound will produce less energy than the previous. In addition to oxygen, nitrate is the strongest available oxidizing agent. Nitrate (NO_3^-) is reduced, and converted into nitrogen (N_2) by anaerobic nitrogen fixing bacteria in the process of denitrification. Once both oxygen and nitrogen species are consumed, metals are then used for metabolic processes. Commonly reduced metals are both iron and manganese. Ferric iron (Fe^{3+}) is reduced to ferrous iron (Fe^{2+}). This process is facilitated by iron reducing bacteria that may also have the capacity to methylate mercury. After iron is reduced, then sulfate (SO_4^{2-}) is reduced into hydrogen sulfide (H_2S or HS^-) by sulfate reducing bacteria. These bacteria are responsible for the methylation of mercury in anaerobic conditions. Then lastly, methanogenesis occurs in a reaction that reduces CO_2 to CH_4. This reaction occurs under the most anaerobic conditions, if all other oxidants are in low quantities or are depleted. Methanogenesis occurs in swamps, rice paddies, and flooded areas that are frequently or permanently flooded. As each subsequent compound is used for respiration, less and less energy is produced (Figure 8 Baker et al. 2000).

Reaction	Reductive processes equation	Free energy $\Delta G^o(w)$ (kcal)
Aerobic respiration	$CH_2O + O_2 = CO_2 + H_2O$	−120.0
Denitrification	$CH_2O + (4/5)NO_3^- + (4/5)H^+ = (7/5)H_2O + (2/5)N_2 + CO_2$	−113.9
Mn(IV) reduction	$CH_2O + 2MnO_2 + 4H^+ = 2Mn^{2+} + 3H_2O + CO_2$	−81.3
Fe(III) reduction	$CH_2O + 8H^+ + 4Fe(OH)_3 = 4Fe^{2+} + 11H_2O + CO_2$	−27.7
Sulfate reduction	$CH_2O + (½)SO_4^{2-} + (½)H^+ = (½)HS^- + H_2O + CO_2$	−25.0
Methanogenesis	$CH_2O + (½)CO_2 = (½)CH_4 + CO_2$	−19.2
Fermentation	$CH_2O + (1/3)H_2O = (2/3)CH_3OH + (1/3)CO_2$	−8.6

Reaction	Oxidative processes equation	Free energy $\Delta G^o(w)$ (kcal)
Methane oxidation	$O_2 + (½)CH_4 = (½)CO_2 + H_2O$	−97.7
Sulfur oxidation	$O_2 + (½)HS^- = (½)SO_4^{2-} + (½)H^+$	−95.0
Fe(II) oxidation	$O_2 + 4Fe^{2+} + 10H_2O = 4Fe(OH)_3 + 8H^+$	−92.3
Nitrification	$O_2 + (½)NH_4^+ = (½)NO_3^- + H^+ + (½)H_2O$	−41.7
Mn(II) oxidation	$O_2 + 2Mn^{2+} + 2H_2O = 2MnO_2 + 4H^+$	−38.6

Figure 10. The sequence of redox reactions in aqueous environments and their respective free energy (Baker et al. 2000)

Nitrate Addition as a Remediation Strategy

Understanding environmental redox conditions are essential in knowing how chemical additions, such as nitrate, control the methylation of mercury in an aquatic system. Using chemicals as an additive to prevent the conversion of mercury is a novel in situ remediation approach, with the most common additive being nitrate (NO_3^-), specifically calcium nitrate ($Ca(NO_3)_2$) (Matthews et al. 2015). This technique is currently being investigated on the East Coast of the United States within lakes and reservoirs contaminated by mercury.

There are a number of mechanisms for regulating the release of methylmercury through the use of chemicals additions. The addition of nitrate prevents an aquatic system from entering heavily reduced conditions, whereas additions of iron and sulfate are the main chemicals that facilitate metabolic activity of microbes. The addition of nitrate has been shown to prevent the production of methylmercury in aquatic systems (Matthews et al. 2013). Nitrate is a strong oxidizing agent, and ideal for the consumption of organic matter by microbes if oxygen is not

readily available. Adding nitrate into a lake or reservoir promotes the growth of denitrifying bacteria as the dominant active microorganisms within an aquatic system and prevents dominance of SRB from becoming the dominant and active species (Matthews et al. 2013). Denitrifying bacteria are not capable of mercury methylation, unlike iron, or sulfate reducing bacteria (Cleckner et al. 1999). This suppresses the growth of SRB and little methylmercury is produced. In addition, this mechanism suppresses both iron and manganese reduction and inhibits anaerobic metabolic pathways.

Another posited mechanism for nitrate control on methylmercury accumulation in aquatic systems is the increased sorption of methylmercury to iron and manganese oxyhydroxides in benthic sediments. Under aerobic conditions, ferric iron (Fe^{3+}), the oxidized form, is the dominant iron species. Under anaerobic conditions, ferrous iron (Fe^{2+}), the reduced form of iron is dominant. Ferrous iron is commonly found in anoxic waters and is water soluble. In reduced conditions, it stays in solution and iron reducers will produce ferrous iron through their metabolic activities. For nitrate additions to be effective, it is important to ensure the aquatic system favors ferric iron as the predominant form of iron. This form is not water soluble and precipitates out of the dissolved phase as a particulate. Ferric iron is now available to bind with water molecules, hydroxides (OH^-), and organic matter. These clusters of compounds form flocculants, which attracts methylmercury and sticks to the flocculent. Oxyhydroxides have a large surface area, so many methylmercury atoms can stick to it. At this point, the flocculent is too big for phytoplankton to passively or actively take up into their cell walls, preventing methylmercury from entering the food web. Once sorbed to the iron or manganese oxyhydroxide, methylmercury is not biologically available for uptake.

Benefits of Implementing Nitrate Addition

The addition of nitrate into a mercury-contaminated body of water is a novel remediation method. This method relies on manipulating redox conditions within a lake to prevent the methylation of mercury, and subsequent release into the food web. Nitrate addition promotes the growth of denitrifying bacteria and their consumption of nitrate for their metabolic processes. Denitrifying bacteria are not known for their methylating properties. With appropriate redox conditions the methylation of mercury is prohibited. Conditions in these lakes are more likely to

be in an oxidized state and water quality improves. This also has the added benefit of preventing the release of iron and manganese that reduce the aesthetic quality of drinking water. The sorption of iron, manganese and sulfide stays bound to sediments or other compounds, which are not released into ambient drinking water, causing poor taste and smell.

Nitrate additions have been used to successfully control mercury methylation in the State of New York at Onondaga Lake in 2011. A local chlor-alkali plant discharged 75,00 kg of mercury into the lake contaminating aquatic biota and benthic sediments (Matthews et al. 2013). To remediate the lake, a liquid calcium nitrate solution was added to the hypolimnion three times per week from June 30 to October 10 to control the release of methylmercury. At the end of this pilot study methylmercury levels had decreased by 95% from previous levels recorded in 2009 (Matthews et al. 2013). It was also noted that during fall turnover, methylmercury concentrations were not apparent, demonstrating a successful control of methylmercury release in Onondaga Lake (Matthews et al. 2013).

Nitrate additions are not a cost prohibitive remediation method like dredging. Both solid and liquid calcium nitrate solutions can be easily purchased. Typical calcium nitrate solutions can approximately cost $2.00 to $20.00 per gallon (USP Technologies, 2017). However, total costs will depend on: the volume of lake water that needs to be treated, how often this lake water needs to be treated, the initial mass of calcium nitrate, tap water that is combined with calcium nitrate to form a calcium nitrate solution, and subsequent delivery method into the lake (hose or pump system).

Challenges of Implementing Nitrate Addition

There are a number of challenges when adding nitrate to a mercury contaminated lake or reservoir. Within the State of California, excess nitrogen is problematic. California is responsible for producing more than one third of the vegetables in the United States and two thirds of the country's fruits and nuts (CDFA 2016). Vast amounts of farmland are required to produce such a large crop volume, which need a large amount of nitrate based fertilizers. Excess nitrate that is used to fertilize crops runs off into nearby waterways during heavy rainfall events. This runoff will eventually drain into larger rivers or waterways, causing eutrophication and hypoxic conditions downstream. This extra nitrogen can cause rapid growth of aquatic plants and algae in

California's lakes. When plants and algae respire, and decompose, they consume oxygen in the water leading to hypoxia, fish kills and eutrophication. Such conditions are favorable for the methylation of mercury and growth of sulfate or iron reducing bacteria, thereby increasing methylmercury concentrations in lake water.

Excess nitrogen is also problematic if it enters groundwater aquifers or reservoirs used for drinking water and human consumption. If humans, especially infants, consume water with excess nitrogen, they can contract blue baby syndrome. Nitrate is consumed and then converted into nitrite in the stomach or digestive system (Knobeloch et al. 2000). Nitrite is responsible for oxidizing the hemoglobin in red blood cells, which is then transformed into methemoglobin (Knobeloch et al. 2000). Methemoglobin is unable to transport oxygen like hemoglobin. This condition prevents the blood from moving oxygen into the body's cells, causing a blue coloration in babies. This is especially concerning because nitrate contamination and exposure mainly occurs through consumption of private well water, of which sixteen percent of the US population depends (Manassaram et al. 2006).

Nitrate addition for remediation of mercury is problematic for both environmental and human health reasons. The addition of excess nitrate in lakes and reservoirs causes eutrophication in the State of California, since nitrate is limiting. People who consume water with excess nitrogen can contract blue baby syndrome. These environmental and human health outcomes may not be worth the risk. Nitrate addition may suppress the production of methylmercury, but produces nitrogen, which is already a problematic surface and groundwater contaminant.

Comparative Analysis of Remediation Methods

Implementation of mercury control in lakes and reservoirs is a complex matter. Each method discussed previously has a number of advantages and disadvantages to its implementation remediation of mercury within lakes and reservoirs. Environmental managers and policy makers will have to critically analyze all benefits and drawbacks when choosing a remediation method. A number of important criteria have been chosen to compare benefits and challenges. They are equally weighted and are listed in no particular order. Table 3 presents a summary of results of the comparative analysis of remediation methods.

Table 3. Summary of Comparative Analysis of Remediation Methods

Method	Type of Treatment	Cost	Level of Contamination	Time Scale to Decontamination/ Hg Control	Appropriate for CA	Advantages	Disadvantages	Project Implementation Example
Capping	Containment	$$	Low-Medium	Fast	Yes	Effective, Ideal for low hydrodynamic flows	Does not remove Hg, possible remobilization of sediments during installaion	Almaden Lake, San Jose (CA)
Dredging	Removal	$$$	High	Fast	Yes	Ideal for highly contaminated sites	Invasive, possible remobilization, requires constant monitoring to ensure efficacy	Minamata Bay, Japan
Hypolimnetic Oxygenation	Prevents Methylation	$$	Low-Medium	Medium	Yes	Maintain cool water temperatures, high DO levels	Cannot overcome oxygen defecit, does not remove Hg from a system	Stevens Creek Reservoir, Guadalupe Reservoir, Almaden Reservoir, Calero Reservoir (CA)
Nitrate Addition	Prevents Methylation	$	Low-Medium	Medium	No	Favors growth of denitrifying bacteria, non Hg methylators	Can cause eutrophication, pollutes drinking water	Onondaga Lake (NY)
Phytoremediation	Removal	$	Medium-High	Slow	Possibly	Non invasive, removes metals other than Hg, garners public support, effective	Few species will sequester Hg, risk introducing invasive/non-native species into aquatic systems	Tapajos Lake, Negro Lake, Amazon River, Brazil

The following criteria were used to analyze each remediation method:

1. Type of Treatment
2. Cost (If applicable)
3. Level of Contamination
4. Time Scale to Decontamination/Mercury Control
5. Appropriate for California
6. Advantages
7. Disadvantages

Chemical additions, like calcium nitrate, have been a novel approach to control the methylation and release of mercury within aquatic systems on the East Coast. A number of pilot studies have been successful in New York and Virginia, but nitrate studies have not been conducted west of the Mississippi. Remediation by nitrate addition is done by controlling redox reactions and promoting the growth of denitrifying bacteria. Results of Matthews et al. (2013) study showed successful mercury control within one summer season. However, even with its inexpensive cost, nitrate additions are not a contaminant removal method. As a whole, nitrate additions would be problematic within California since the state already has issues with eutrophication, fish kills, hypoxia in rivers and lakes, and groundwater pollution. A significant percentage of Californians depend on well water, much of which is already contaminated with

nitrate. Excess nitrate in drinking water causes a serious risk to pregnant women and children for contracting blue baby syndrome. It would be counterproductive for an environmental manager to implement this method and would be trading one issue for another. Overall, there are too many disadvantages related to nitrate additions for this method to be effective for mercury control within the State of California.

In contrast to nitrate additions, dredging is a well-established and effective method for mercury removal within aquatic systems. Dredging was successfully used to restore Minamata Bay, Japan (1970s-1990s). The total mass of mercury found within benthic sediments of the Bay were estimated to be 3.4 tons, and an average concentration of mercury in surface sediments was 3.0 mg/kg (Akito et al. 2014). This project successfully decreased total mercury concentrations from 553 mg/kg to 16 mg/kg (Akito et al. 2014). Dredging is an excellent remediation method in case of an emergency spill, in a heavily contaminated area or if used in the excavation of point source pollution, but expensive costs may prohibit its use.

Dredging is a fairly invasive removal and remediation method that can disturb underlying sediment. This remobilizes sediments into upper waters, increases turbidity, and can make methylmercury available for uptake by phytoplankton, which makes this method ideal only for highly contaminated sites. Other methods, like hypolimnetic oxygenation, capping and phytoremediation can all control the release of mercury, but are much less disruptive. In addition, dredging is also cost prohibitive for sites that have low to medium mercury contamination. The removal of one cubic meter of sediment is estimated to cost approximately $1500 (Wang et al. 2014). The excavation and disposal of one acre of contaminated soil has been estimated to cost $400,000 (Henry 2000). Clearly, for large contaminated sites, removal of sediments can be extremely expensive and cost prohibitive for many environmental managers. For highly contaminated sites, or sites that have high risk of exposure to the public the cost may be justified. However, many lakes and reservoirs in California are either smaller in size, or have lower mercury concentrations, making dredging an inadequate remediation choice. Dredging does not seem like the optimal remediation choice in most of California's lakes and reservoirs.

Like dredging, phytoremediation is a well-tested and effective remediation method, and garners broad public support. Phytoremediation uses plant biomass to remove heavy metals from contaminated sediments to decrease their concentrations within the environment. This method has been used locally, and globally, to control a number of heavy metals aside from mercury,

including but not limited to cadmium, zinc, and arsenic (Henry 2000). It can be used to decrease any concentration of a contaminant, but is often used to treat heavily contaminated sites due to its ease of implementation and cost effectiveness.

Phytoremediation is the most cost effective method out of all remediation methods discussed in this paper. Costs can range from $60,000 to $100,000 to treat one acre of contaminated soil (50 cm in depth) while implementing other methods, can cost hundreds of thousands, if not millions of dollars (Henry 2000). Costs come from propagating or purchasing and shipping the plants to the contaminated site. Installation can be done for a minimal cost, or even be completed by staff with only minimal training and proper protective equipment.

Even with public support and the low cost, there are some serious drawbacks that need to be considered before environmental managers implement this method to control or clean up large scale mercury concentration. Phytoremediation is a very slow process. The accumulation of a heavy metal like mercury will impede a plant's natural growth. The timescale to decontaminate a site, or decrease concentrations to acceptable levels can take years if not decades to accomplish. Then, once the plant biomass has accumulated enough mercury to be deemed acceptable, the plant matter must be removed and treated as hazardous waste and stored properly. If it is not removed, the plants will decompose and the accumulated mercury will then be released back into the environment, rendering the process ineffective.

Phytoremediation may introduce non-native and invasive plant species into aquatic systems of California. There are a number of plant species that can accumulate mercury, like water hyacinths, sea rush and large leaf holly fern (Skinner et al. 2007) (Chattopadhyay et al. 2012). However, outside of their native habitat, these plants can be very invasive. This introduction can alter sensitive environments and change the ecological roles each species plays in a system. Non-native plants may grow uncontrollably, given the right conditions, out competing other species and changing ecological communities for the worse. If this method were employed in lakes and reservoirs in California, environmental managers would have to implement removal programs for the invasive plant species used for phytoremediation.

Another drawback to the implementation of phytoremediation is the fact that plants can only penetrate the first few meters of contaminated soils. Their uptake of mercury is limited to the physical reach of their root structure. Phytoremediation is not effective if there is a deep layer of contaminated sediment. Therefore, the removal of mercury would be incomplete and another

remediation method or species would have to be implemented to reach the deepest layer of contamination. Removal via phytoremediation is ideal for shallow lakes or contamination along the banks of a lake where the depth of contamination is shallow and sunlight can promote plant growth. Phytoremediation cannot be used when attempting to treat benthic soils, deep within lakes and reservoirs, since plants cannot grow at these depths.

Environmental managers will have to decide if the ecological risks associated with phytoremediation outweigh the need to decrease mercury concentrations within aquatic systems. If native plants can be used for remediation, then risks are low. Overall, phytoremediation is a low-cost method that can remove a variety of heavy metals from sediments but the benefits may end there. The method is slow and may only be effective in very shallow waters, and in most cases, would require a second method to remove mercury from deeper sediments. After the uptake of mercury, plant biomass must be treated as hazardous waste and properly disposed. Finally, further research is necessary to identify, or genetically modify mercury accumulators that are endemic to California to avoid the introduction of invasive plant species. Phytoremediation may be a remediation option in limited cases, but within the State of California it should be implemented with caution.

Like dredging and phytoremediation, aqueous capping is a well-tested and effective method for mercury control. Materials like sand, gravel or geotextile fabrics isolate contaminated sediments from ambient waters, preventing the release of mercury into the food web. Methylmercury can be sorbed to these materials, preventing their escape into ambient waters. Even with highly sorptive materials, methylmercury can still escape through the cap if it is punctured. This can occur through bioturbation and activity of benthic organisms or remobilization during high hydrodynamic flows, like strong groundwater currents, storms, tides or human activity. In this case, it is imperative that the cap be at least 20 cm thick to reduce the risk of puncture and remobilization (Ndungu et al. 2016). Capping is ideal for containing a range of low to medium mercury concentrations. Capping is also a viable method for lakes or reservoirs small in size. The materials, labor and installation expenses can become cumbersome and cost prohibitive, if large areas need to be capped (Henry 2000).

Implementing hypolimnetic oxygenation as a method to control the release of methylmercury in California lakes and reservoirs is the least problematic and most promising method discussed in this paper. HOS systems have already been successfully installed and are a

proven method located in four lakes in the Guadalupe River watershed, San Jose, California (McCord et al. 2016). These lakes are contaminated from mercury tailings and mining activities from New Almaden Quicksilver mine.

Using an HOS system presents to control the release of mercury into ambient waters presents a large number of benefits. The most important benefit is that abiotic conditions prevents mercury bioaccumulation in fish and other aquatic biota, by preventing the methylation and subsequent release of mercury into the food web. Furthermore, an oxygenated hypolimnion prevents sulfate and iron reducing bacteria from methylating mercury.

Equally advantageous is the fact that HOS causes no ecological harm to the body of water being treated. In fact, HOS systems increase dissolved oxygen levels and decrease ambient water temperatures, which fish and aquatic plants need to survive. This improves overall abiotic conditions, keeps lakes oxygenated, while still maintaining cool temperatures that stratification sportfish species and consumable fish species need to survive even in summer months. Also, increased DO levels and cool temperatures benefit downstream habitats and improve drinking water quality if reservoirs are using this as potable.

The benefits to both in-lake and downstream water quality make HOS the ideal choice for environmental managers when compared to other remediation techniques. HOS does not cause remobilization of mercury like capping or dredging. It is a much less invasive technique and does not damage benthic systems like capping does. It does not subject to the surrounding ecosystem to an aggressive invasive plant species like the phytoremediation method.

In terms of cost, installing an HOS system is not the cheapest method, nor is it the most expensive. Expenses relating to this method include the purchase of machinery, installation cost, energy requirements and purchase of liquid or gaseous oxygen, which costs about $100/ton (Moore et al. 2016). While the initial equipment costs of HOS are high, it should be viewed as an investment for the community that uses the lake for recreation and for improvement of aquatic environments. HOS has the added bonus of limited energy requirements. The system only needs to be run 6-8 months out of the year. Lakes and SRB's in the benthic sediments are not as biologically active during the winter months and do not produce as much methylmercury. Lakes and reservoirs during the winter also have a more even distribution due to mixing. Mixing results in homogenized lake layers, increased levels of DO and lower temperatures, preventing anoxic conditions in the benthic layer.

Unlike dredging or phytoremediation, an HOS system does not remove mercury from an already contaminated lake or reservoir. However, it does prevent it from being methylated by controlling abiotic conditions within an aquatic system. In order for this remediation method to be most effective, it should be implemented before the spring turnover and lake stratification occurs. This will help prevent hypoxic conditions in the hypolimnion and deliver an adequate concentration of oxygen. However, these systems should not be viewed as a way to turn a hypoxic lake into an oxic lake. HOS systems are designed to deliver a set concentration of DO. If anoxic conditions are extreme, there just is just not enough oxygen being delivered to overcome this deficit. These systems need to be implemented proactively, and not retroactively in late winter or early spring.

Another benefit of the HOS method is that the system is completely adaptable to both small and large bodies of water, depending on the selection of the delivery device. Not all devices are appropriate for all aquatic systems. For relatively shallow lakes and reservoirs ($\leq$ 10 m) speece cones should be installed in the hypolimnion (Moore et al. 2016). Speece cones deliver high concentrations of oxygen rich waters over a smaller area of sediments. Also, they are more cost effective compared to implementing them over a large area. Deeper lakes and reservoirs ($\geq$14m) should have line diffusers installed. Line diffusers can cover and oxygenate a much larger area than speece cones can and are economically feasible for this purpose (Moore et al. 2016).

Implementing line diffusers can also create weak circulation within the hypolimnion, without destratifying layers of a lake. This can prevent methylmercury in the water column from being brought to the surface where it then becomes bioavailable to phytoplankton. The velocity of outflow and bubble size can be adjusted to suit a variety of water quality needs. So much so that the released plume from the device rises to the top of the hypolimnion, spreads out horizontally, and then becomes negatively buoyant and will sink down to the benthic layer of the lake, oxygenating the bottom. The variety, flexibility, and control over these devices makes it an ideal choice when attempting to control the release of mercury into aquatic systems.

Over time, scientists and engineers have developed a variety of methods to control the release of mercury and minimize risks of exposure in both wildlife and humans. Each method addressed in this paper is effective, in that it either removes mercury from a system, or prevents the process of methylation. However, there is no one infallible remediation method applicable to

all freshwater systems in the State of California. To choose the most appropriate method, or combination of methods, environmental managers will have to prioritize their own criteria to determine the most appropriate method for their site.

Recommendations

Implement Hypolimnetic Oxygenation for Effective Mercury Control

A comprehensive approach is necessary to achieve effective remediation control of methylmercury contamination within lakes and reservoirs. There are three general options to address mercury remediation: control the process of methylation of mercury found in aquatic systems, prevent the introduction of mercury into the environment in the first place; and minimize exposure risk to humans by preventing consumption of mercury contaminated fish. The recommendations suggested here will attempt to provide a variety of options for environmental managers, policy makers and the general public.

The most efficient way to prevent methylation of mercury in an aquatic system is to implement hypolimnetic oxygenation. HOS is the least problematic remediation choice when choosing a method to control the release of mercury into aquatic systems compared to the other four methods I analyzed. HOS controls the release of mercury, and prevents its' methylation and bioavailability. The increase of dissolved oxygen prevents hypoxic conditions, therefore inhibiting the growth of sulfate reducing bacteria. This then prevents the methylation and release of methylmercury into the food web.

The in situ aqueous capping method physically isolates it from ambient water, yet still allows for the production of methylmercury underneath the cap. There is a risk of puncturing the cap and subsequent mercury release into ambient waters. However, capping can still be a viable method to control mercury if the cap is made of proper material and thick enough to prevent puncture. In order to be extremely effective, continuous monitoring is necessary to determine if the mercury is contained in the aqueous cap.

HOS will not cause eutrophication and does not pollute drinking water like the nitrate additions method. The use of nitrate as a remediation method to control the release of mercury into the environment is not recommended in California. Excess nitrate in aquatic systems in California can cause eutrophication and fish kills, thereby decreasing the oxygen levels in a lake and creating conditions for sulfate reducing bacteria to flourish and methylate mercury. Successful pilot studies have been conducted east of the Mississippi River where phosphorous is the limiting nutrient, however, studies of this kind have been conducted on the West Coast where nitrogen is the limiting nutrient. Further small-scale studies need to be conducted to determine

additional mechanisms of mercury control and why nitrate additions are a viable option based on geographic region without creating eutrophication.

Dredging is a viable method for cleaning up point source pollution or sites with a high risk of direct mercury exposure to the public. However, the majority of lakes in the State of California do not fall into this category. Further, the hydraulic and mechanical removal of sediment comes at a high risk of remobilizing sediment contaminated with mercury. This risk of mercury remobilization and the high cost of dredging make other remediation methods advisable.

Phytoremediation can be used to remove mercury from a contaminated system over time. However, this method risks the introduction of invasive plant species into endemic California ecosystems. HOS implementation does not increase this risk. Plant species that accumulate mercury, like the water hyacinth and sea rush, can be invasive and problematic if not controlled properly. Although HOS does not remove mercury from a system like phytoremediation does. If implemented proactively, can prevent mercury from entering the food web by arresting the production of methylmercury. Installing and operating an HOS system is much more expensive than phytoremediation due to the purchase of an HOS device, its installation and cost of energy use. While costs for phytoremediation only include the cost of propagating the plants and their transport. Installation of plants can be conducted by trained volunteers, with minimal cost. For these reasons, hypolimnetic oxygenation is the ideal remediation method to control mercury release into freshwater aquatic systems.

Statewide Ranking of Contaminated Lakes

Realistically, there is not enough State funding for every mercury-contaminated lake to be completely remediated. I recommend that each lake or reservoir should be ranked and prioritized for remediation action. Ranking criteria should be weighted and based on the following: volume of each lake, the level of mercury contamination (high, medium, low), presence of sport or consumable fish and their population size, proximity to vulnerable communities that rely on subsistence fishing, and high hydrodynamic flows (risk of mercury transport). Site assessments should then be conducted and a statewide report would be compiled, ranking each lake or reservoir from highest remediation action, to the lowest. Using these criteria, an additional geospatial analysis should be conducted to identify lakes with high priority for remediation, and

their proximity to vulnerable communities that depend on subsistence fishing. These analyses and site visits could help environmental managers to target remediation actions and identify communities most at risk for mercury exposure and mitigate these risks.

Monitor Mercury Concentrations at Lower Trophic Levels

Traditionally, mercury concentrations are analyzed from fish species relatively high on the food chain or taken from sediment cores. Mercury concentrations found within fish tissues give a relatively accurate proxy of how much methylmercury is in biota in an aquatic system (McCord et al. 2016). However, monitoring methylmercury concentrations at lower trophic levels would give more accurate concentrations within biota in a lake. Monitoring and analyzing mercury concentrations of species lower on the food chain will quickly tell environmental managers if their remediation methods are effective (McCord et al. 2016). If there is little to no mercury uptake in these species, that is an indicator that the remediation methods are working and mercury is not becoming bioavailable or accumulating (McCord et al. 2016). By monitoring methylmercury concentrations within various organisms, like benthic invertebrates, or even phytoplankton, researchers can quickly identify whether or not methylmercury is bioavailable. Using fish tissue as a way to identify methylmercury concentrations is a delayed monitoring method. It takes months to years for methylmercury to bioaccumulate up the food chain and fish to be large enough to obtain appropriate tissue samples (Gochfeld 2003). Further research is necessary to improve methodology to accurately for accurately assessing methylmercury concentrations in an aquatic system. In addition to this, the mechanisms and reasons for methylmercury uptake by phytoplankton is still unknown. These processes need to be elucidated first, before methods can be improved. In the interim, monitoring methylmercury concentrations in benthic invertebrate species might be a viable substitute.

Reduce Atmospheric Mercury Emissions

Globally, the majority of mercury that is released into the environment comes from atmospheric emissions. By decreasing atmospheric mercury emissions, the amount of mercury that is deposited into watersheds decreases. Curbing global mercury emissions will prevent mercury from entering watersheds and bioaccumulating in aquatic organisms. Reducing atmospheric

emissions will therefore reduce the amount of methylmercury that is bioaccumulated in aquatic organisms. The majority of mercury atmospheric emissions that are deposited onto the State of California come from eastern Asia (Steding and Flegal 2002). Reducing these emissions will reduce the amount of mercury that is deposited in the State of California.

Mercury emissions can be controlled or decreased in several ways. Switching to a more environmentally friendly energy source would also lower atmospheric emissions of mercury both locally and globally. Emerging energy markets of hydropower, solar, nuclear, and wind energy are increasing in popularity. Currently, China has the largest atmospheric mercury emissions by country per capita (Hu and Cheng 2016). This phenomenon will eventually decrease the dependence on coal-combustion for energy and displace coal-fired energy, decrease mercury emissions, while still supporting a country's energy growth needs. Decreasing emissions in both developing and developed countries will collectively decrease mercury emissions, mercury transport and deposition. In China, coal fired power generation is projected to decrease from 54% to 35% by 2030 due to the switch to alternative energy (Hu and Cheng 2016). This phenomenon will eventually decrease the dependence on coal-combustion for energy and displace coal-fired energy, decrease mercury emissions, while still supporting a country's energy growth and needs. California estimates that 29 percent of its electricity sales in 2016 were met by renewable energy from wind, solar, geothermal, biomass and hydroelectric (CEC 2017). And by 2030, 50% of its retail sales will come from renewable energy (CEC 2017). This demonstrates a significant shift away from fossil fuel dependence. Decreasing fossil fuel use will decrease atmospheric mercury deposition. Atmospheric mercury can stay suspended for six months to two years before being deposited to the earth (Steding and Flegal 2002). This long residence time allows for wind transport and deposition of mercury far away from the point source. Much of California's atmospheric mercury that is deposited here comes from eastern Asia, specifically China. Controlling the release of mercury, by switching to alternative energies and decreasing dependence on fossil fuels in China will decrease the amount of mercury deposited in California.

Until alternative energies are the primary source of power, it is necessary to implement legislation to control mercury emissions from stationary coal burning power plants. About 9.9 percent of all energy consumed in the U.S. in 2015 came from renewable sources and in 2012 the U.S. was the world's largest consumer of renewable energy (IER 2017). However, a significant increase in consumption and production of renewable energy is necessary to combat fossil fuel

dependence. The Environmental Protection Agency (EPA) in December of 2011 enacted a rule that would decrease emissions of mercury and other hazardous air pollutants from both existing and new coal and oil based power plants with an energy capacity greater than 25 megawatts (EPA 2017). The Mercury and Air Toxics Standards (MATS) was the first national standard to reduce mercury and other toxic air pollutants since the 1990 Clean Air Act (EPA, 2017). Approximately 1400 coal and oil fired power plants in the U.S. are active, a majority of which do not control their emissions of toxic pollutants (EPA 2017). Currently 50% of mercury emissions from the U.S. come from power plants and more stringent mercury control is necessary. This stringent ruling will help prevent 90% of mercury from stationary coal burning power plants from being emitted, reduce 88% of acid gas emissions and reduce sulfur dioxide emissions by 41% (EPA 2017). This single regulatory action is a strong example of stricter emission controls and prevention of mercury releases into the environment. Ideally this ruling could be used as an example for other countries who need to adopt stricter laws concerning mercury emissions, like Brazil, China and India.

Advanced pollution control equipment should be installed and implemented to control mercury releases in coal-based power plants. An estimated 44% of all coal fired power plants lack advanced pollution control equipment (EPA 2017). Installing advanced control methods would decrease emissions of harmful air pollutants, mercury included. Air pollution control devices like fabric filters, electrostatic precipitators and activated carbon injection, can all capture a variety of different mercury species from coal fired power plant emissions (Table 4). These advanced control devices also have the added benefit of removing other hazardous air pollutants, like NO_x, SO_x, and particulate matter (Hu and Cheng 2016). Combined actions of legislation and advanced pollution control devices would have a positive impact on human health and the environment.

Table 4. Summary Table of Advanced Air Pollution Control Devices (Hu and Cheng 2016)

Control measure/device	Intended air pollutant control	Impact on mercury removal
Combustion controls	NO_X, dioxins, and furans	Mercury can be controlled as a co-benefit
Coal washing	Particulate matter and SO_2	Significant fractions of mercury are also removed from the coal
Electrostatic precipitator	Particulate matter	Mercury (primarily particulate mercury) can be removed as a co-benefit
Fabric filter	Particulate matter	Mercury (primarily particulate mercury) can be removed as a co-benefit
Cyclone	Particulate matter	Mercury (primarily particulate mercury) can be removed as a co-benefit
Dry scrubber	Acidic gases (SO_2 and HCl), and some particulate matter (when combined with downstream particulate matter control devices)	Can remove some mercury as a co-benefit
Wet scrubber	Acidic gases (SO_2 and HCl), and some particulate matter	Can remove some mercury as a co-benefit
Dry sorbent injection	Acidic gases (SO_2 and HCl), and some NO_X	Can remove some mercury as a co-benefit
Wet flue gas desulfurization	SO_2	Mercury (primarily oxidized mercury) can be removed as a co-benefit
Selective catalytic reduction	NO_X	Mercury can be removed (primarily through causing mercury oxidation) as a co-benefit
Selective non-catalytic reduction	NO_X	Has little or no effect on mercury emission reduction
Activated carbon injection	Mercury, dioxins, and furans	Mercury can be effectively removed (primarily through adsorption) as a co-benefit or as the target pollutant

Consumption of Fish Species Lower on the Food Chain

Consuming fish as a low fat, high protein animal meat has dietary benefits, including but not limited to intake of omega 3 fatty acids that help cell development in the body and are essential for brain development in young children (Wenstrom 2014). However, due to the increase of mercury contamination in freshwater systems and bioaccumulation, there is the risk of exposure to mercury in humans when eating fish. Eating fish or shellfish that is found lower on the food chain will reduce mercury intake. The people who subsist on freshwater fish often are subsistence anglers, immigrant communities, or in low socioeconomic groups. They depend on easily accessible freshwater fish to feed themselves or their families. Fish found in freshwater systems are an easy and inexpensive animal protein.

Although all fish found in mercury-contaminated lakes and reservoirs are exposed to mercury, the tertiary species accumulate the highest levels of mercury in their tissues. Therefore, eating smaller fish lower in the food chain will minimize the intake and exposure to mercury, reducing the risk of adverse health effects. Generally speaking, older, larger fish have lived longer and have accumulated higher concentrations of mercury in their tissues. Consequently, eating smaller sized fish can reduce a person's mercury intake.

The California Office of Environmental Health Hazard Assessment (OEHHA) has published a number of online documents and interactive tools that can aid the general public about identifying species of fish that are suitable to eat and how often these species can be consumed with a minimal risk of mercury exposure. The Fish Consumption Advisories and Safe

Eating Guidelines tool can be found at: https://oehha.ca.gov/fish/advisories. People who consume fish can navigate to this tool online and look up their location by county, waterbodies found in California, and fish species (Figure 9). After typing these data into the tool, the tool shows a tabular breakdown of the fish species by location that are safe to consume, as well as any subsequent fish consumption advisories or warnings. The fish consumption advisories and Safe Eating navigation tool can also be accessed via a mobile device with access to the internet. This tool is incredibly powerful, allowing the general public to become educated and make smarter dietary choices, thereby reducing their overall exposure to mercury.

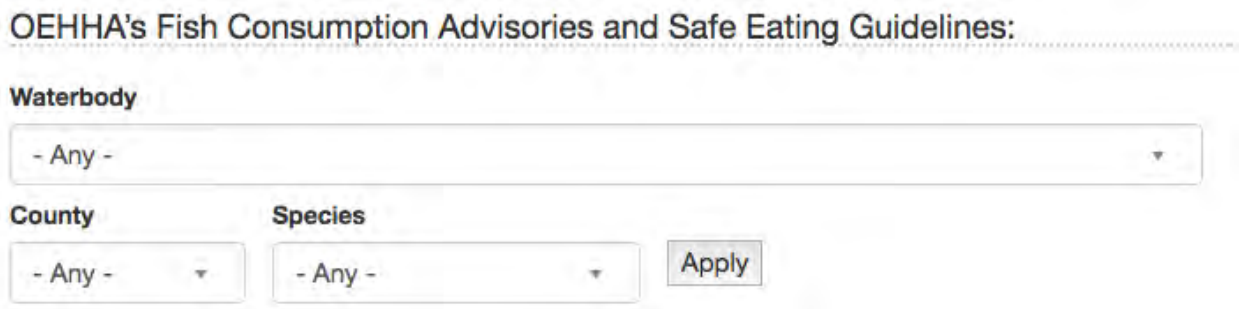


Figure 11. Fish consumption advisories and Safe Eating navigation tool (CalEPA 2016)

In order to reduce this risk, the public should be educated to eat fish low on the food chain, or to cut out fish consumption entirely for a vegetarian or vegan diet, if economically feasible. Both the U.S. Food and Drug Administration and the Environmental Protection Agency published nation-wide advisory as of 2004 (FDA 2017). This education program is still relevant today. These consumption advisories have been, and will continue to reduce the risk of exposure to mercury in humans and sensitive groups.

The advisory recommends that children, young women, or women that may become pregnant, avoid fish that contain high levels of mercury. The three-main recommendations that stem from this advisory are the following:

1. Do not eat shark, swordfish, king mackerel or tilefish. They have high levels of methylmercury
2. On average eat two means a week consisting of a variety of fish and shellfish that have low methylmercury concentrations
3. Adhere to local fish consumption advisories before consuming fish in local lakes, rivers and coastal areas

a. If no advice is available, on average, eat one meal per week of fish that is caught in local waters, and do not consume any other fish during that week
    i. One serving of fish is considered approximately the width and thickness of the palm of a hand. Therefore, an adult serving of fish should be larger and thicker than a serving for a child (Figure 11).

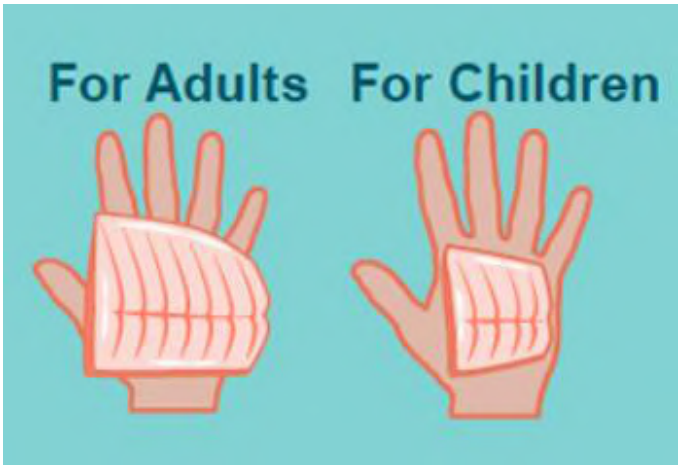


Figure 12. Approximate serving size of fish for children and adults (CalEPA 2017)

In addition to adhering to the FDA and EPA fish consumption advisories, it is also recommended to increase signage, warning the public about the dangers of mercury consumption in contaminated fish. In addition to this, the number of languages found on each sign should be increased. Many subsistence anglers either do not speak English, or English is not their first language. Overcoming this language barrier will make fish consumption advisories more accessible to the public. Increasing the number of languages and number of signs will educate the public and reduce the risk of exposure due to consumption of contaminated fish in freshwater systems.

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Attachment G-3:
Comment Letters

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

February 4, 2020

Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Re: Almaden Lake Improvement Project, Draft Environmental Impact Report (December 2019)

Dear Mr. Martin:

Thank you for the opportunity to provide comments on the Santa Clara Valley Water District's (Valley Water) Draft Environmental Impact Report (DEIR) for the Almaden Lake Improvement Project (project). Valley Water proposes to restore Alamitos Creek within Almaden Lake Park and eliminate the current condition where the creek flows through the lake. NOAA's National Marine Fisheries Service (NMFS) supports the project's objectives to separate Alamitos Creek from Almaden Lake, reduce production of methylmercury, remove potential lake entrainment of anadromous fish, improve water temperature conditions, reduce predation of native fish, and minimize impacts to existing recreational features. However, we are concerned that the proposed project will not fully achieve the fisheries-related objectives due to the DEIR's assumed water surface elevation associated with the seasonal operation of the flashboards at the Alamitos Diversion Dam. Additionally, the DEIR's basis for rejection of Option 8 – Expanded Creek Restoration is not well supported, and we believe Option 8 should be pursued as a full project alternative. An alternative that addresses the channel from the upstream end of Almaden Lake to the Alamitos Diversion Dam (*i.e.*, Option 8) is considerably more likely to achieve the project's stream restoration and fisheries objectives than the proposed action. Our comments below provide additional information regarding our concerns.

1

2

<u>Creek Restoration and Alamitos Flashboard Dam</u>

Chapter 2 of the DEIR highlights multiple benefits to anadromous fish, including federally-threatened Central California Coast steelhead (*Oncorhynchus mykiss*). Benefits attributed to the proposed project include improved water temperatures for salmonids, reduced predation from non-native species, improved sediment transport, creation of a riffle-pool-run pattern for improved fish habitat, and establishment of native riparian vegetation on the banks to create shade for Alamitos Creek. These fisheries benefits would likely accrue over the full 1,800-foot length of the restored channel reach if the project area was not subjected to seasonal inundation by operation of the Alamitos Diversion Dam. Installation of the flashboards at the Alamitos Diversion Dam raises the elevation of the water surface by approximately 5 feet and this backwater effect extends into the proposed restored reach of Alamitos Creek. However, the DEIR inaccurately states that "… only about 200 linear feet would remain as an impoundment when the flashboard dam is in place…" (see DEIR page 2-24). In fact, the project's 30% design drawings show the backwater effects of the flashboards raise the water surface to an elevation of 192 feet, which comprises approximately 1,200 linear feet of the project's 1,800 feet of restored channel (67% of the entire reach). With the flashboard dam operated by Valley Water from

3

April to December, the majority of the restored length of Alamitos Creek will be subject to pond-like conditions with low water velocities for approximately 9 months of every year. 3 cont.

Riffle-Pool-Run Channel Design. With the backwater effects of the Alamitos Diversion Dam extending a significant distance upstream, the project's geomorphic restoration of the creek's streambed into riffle-pool-run sequences will only be partially effective. Riffles are particularly important for steelhead as they create ideal habitat for food production, surface turbidity for fish cover, protruding rocks for hydraulic complexity, and clean gravels for spawning. Riffles, as defined by the California Salmonid Stream Habitat Restoration Manual (Flosi *et al*., 2012), are shallow to moderately deep reaches with swiftly flowing, turbulent water and some partially exposed substrate. Although the project's restored streambed design includes riffles, runs and pools, when the Alamitos Diversion Dam is operated from April through December, two-thirds of the restored riffles will be flooded and no longer provide the habitat benefits described above. In addition, the lowermost 1,200 linear feet of the restored reach will return to ponded conditions which favor non-native predatory fish. Ponded conditions will also reduce water velocities, thereby increasing water retention time and subsequently having a warming influence on stream temperatures. Banks and lower floodplain areas planted with native riparian vegetation will be less effective in providing the benefits of shaded riverine conditions when backwatered by operation of the flashboards at Alamitos Diversion Dam. The DEIR does not acknowledge these limits to the project's potential fisheries benefits. 4

Spawning Gravels. Within the DEIR's *Summary of Fisheries Benefits* on page 2-24, there is discussion of the project's development of aquatic habitat features for native fish including the deposition of spawning gravels in the restored channel of Alamitos Creek. Monitoring data from the Masson Fishway on Guadalupe Creek suggests late-February and early March are the peak migration months for adult steelhead in the Guadalupe watershed (SCVWD, 2009). When the Alamitos Diversion Dam's flashboards are removed during the winter months, riffles and runs within the restored reach of Alamitos Creek may provide suitable conditions for steelhead spawning. Steelhead eggs hatch into "alevins" after an incubation period of approximately 25-35 days depending on water temperature (Shapovalov & Taft 1954). Alevins remain in the gravel for an additional two to three weeks until they emerge as young juveniles known as "fry". This timing indicates a high probability that unhatched steelhead eggs and alevins will still be in their redds when the flashboards are installed. If adult steelhead do select sites for spawning within the restored reach of the Alamitos Creek channel, the resulting ponded water conditions are unlikely to provide sufficient flow velocity to maintain circulation through their gravel redds, as a clean, well-oxygenated environment is required by alevins and incubating eggs. Therefore, this project may attract steelhead to spawn in areas that become unsuitable for egg and alevin survival when the Alamitos Diversion Dam is operated, and result in the incidental take of threatened CCC steelhead. 5

Almaden Valley Pipeline Water Source. A significant fisheries benefit not presented in the DEIR pertains to the project's development of a new source of water supply for the Los Alamitos Percolation Pond. The proposed flow-through water management system for Almaden Lake uses imported water from the Almaden Valley Pipeline and would supply 5.0 to 7.5 cfs to the Los Alamitos Percolation Pond. The current source of water for the percolation pond is limited to the existing gravity-fed intake, equipped with a 12 cfs fish screen, that operates when the 6

flashboards at the Alamitos Diversion Dam are installed. This additional source of imported water could significantly reduce the amount of water diverted from the Guadalupe River for Los Alamitos Percolation Pond. Reduced diversion rates would allow more streamflow to pass downstream in the Guadalupe River, resulting in improved habitat conditions for spawning and rearing native fish, including anadromous salmonids. This potential fisheries benefit of the project should be presented in the document.

6 cont.

DEIR's Proposed Project and Option 8.

The proposed project would restore approximately 1,800 feet of Alamitos Creek upstream of the Coleman Road Bridge, and as presented above, approximately 1,200 linear feet of the restored channel will be backwatered during operation of the Alamitos Diversion Dam. This ponded condition created by operation of the flashboards also extends approximately 1,700 feet downstream of the Coleman Road Bridge to the dam. In total, the Alamitos Diversion Dam creates pond-like conditions for a contiguous distance of approximately 2,900 linear feet encompassing lower Alamitos Creek, the Guadalupe Creek confluence, and the upper Guadalupe River. Although the proposed project seeks to address adverse effects on fish habitat and sediment transport by separating the creek from the lake, the project's effectiveness will be severely constrained by not addressing the backwatered condition created by the Alamitos Diversion Dam. Non-native predatory fish are likely to continue to thrive in this reach during the 9-month period the flashboards are in place. Thermal warming of streamflows will continue through the long and unshaded reaches of open water. Sediment transport may improve in Alamitos Creek, but will not reconnect the sediment supply to the Guadalupe River. The project's sediment transport analysis concludes sediment will move through the restored reach of Alamitos Creek and then drop into the pool immediately downstream of Coleman Avenue (Xu 2017).

7

Expanded Creek Restoration. During scoping for the project's DEIR in 2014, NMFS requested Valley Water develop an alternative that looks more broadly at the habitat problems for native fish at the confluence of Alamitos and Guadalupe Creeks, and evaluate potential solutions that would include the reach below the Coleman Road Bridge. Recognizing that the effects of the Alamitos Diversion Dam extend upstream into the footprint of the Almaden Lake project, NMFS requested evaluation of the benefits of replacing the flashboard dam with an alternative water diversion method for supplying the Los Alamitos Percolation Pond. Removal of the Alamitos Diversion Dam would eliminate the seasonally ponded condition in the proposed project restoration reach (approximately 1,800 linear feet) and the 1,700-foot long reach below Coleman Road. Full geomorphic restoration could be performed for a distance of approximately 3,500 feet with riffle-pool-run sequences that provide steelhead spawning, rearing, holding, and unimpeded migration habitat. This restoration would eliminate habitat for non-native predatory fish. Additionally, riparian vegetation could establish along the banks and within low floodplain areas, which would reduce thermal warming of the stream and increase beneficial allochthonous input. Furthermore, sediment transport would be restored throughout the entire reach and likely eliminate the need for annual sediment removal from Guadalupe Creek at the Almaden Expressway, minimizing future maintenance costs. By reconnecting the sediment supply from Alamitos and Guadalupe Creeks to the Guadalupe River, coarse sediment naturally routed downstream will replenish spawning gravels for anadromous fish.

Additional fisheries benefits that would accrue with removal of the Alamitos Diversion Dam include the following:

- Although the existing Alamitos fish ladder successfully passes anadromous salmonids upstream and downstream, fish ladders create migration delays and regular maintenance is required. Removal of the diversion dam would allow for removal of the fish ladder.

- During moderate and high streamflow events (in excess of the 50 cfs capacity of the fish ladder), water and fish spill over the concrete diversion dam. With this spill at the dam, threatened CCC steelhead and Chinook salmon are likely injured or killed when they strike the energy dissipation structures at the base of the dam.

- The existing Los Alamitos Percolation Pond water intake (equipped with a 12 cfs-capacity fish screen) could be eliminated with the construction of a pump station or an engineered infiltration gallery installed under the stream channel. The new pump station or infiltration gallery could be downsized from 12 cfs because Valley Water proposes to develop a new source of water to circulate through Almaden Lake (*i.e.*, imported water at a rate of 5 cfs from October through April, and 7.5 cfs from May through September) which would be discharged to the Los Alamitos Percolation Pond.

7 cont.

Option 8 not only meets all of the project objectives, it is a far superior approach because it eliminates the adverse effects associated with the diversion dam and seasonal ponded water conditions over a distance of 0.65 mile. Option 8 can remedy the problems and fully achieve the project's objectives associated with lake entrainment of anadromous fish, thermal warming, predation by non-native fish, creation of riverine habitat, and restoration of sediment transport. This broader approach aligns with the "One Water Plan" vision to "… manage Santa Clara County water resources holistically and sustainably to benefit people and the environment in a way that is informed by community values."

Fisheries and Aquatic Habitat Collaborative Effort. In 2003, Resource agency and Valley Water representatives recognized the importance of looking at lower Alamitos Creek, lower Guadalupe Creek, and the upper Guadalupe River on a reach scale and incorporated section 6.6.2.1.3.3(B) into the draft Settlement Agreement for the Fisheries and Aquatic Habitat Collaborative Effort (FACHE). This provision in the FAHCE Settlement Agreement requires the development of a plan "… to isolate Alamitos Creek and Guadalupe Creek, and to screen flow entering Almaden Lake to prevent entrainment and impingement of steelhead trout and salmon." Guadalupe Creek was specifically included to ensure the plan addresses the entire reach affected by impoundment at the Alamitos Diversion Dam. By excluding the reach below Coleman Road Bridge, the proposed project does not meet the requirements of this provision nor the intent of those who drafted the Settlement Agreement.

8

<u>Discharge of Imported Water to Alamitos Creek.</u>
The DEIR's project description describes the discharge of Almaden Lake overflow water via an outlet pipeline to Alamitos Creek during times when the Los Alamitos Percolation Pond is unavailable. One of the project's primary objectives is to remove the warming influence of Almaden Lake on the stream. This component of the proposed project appears to conflict with

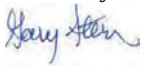
9

that objective since water warmed by Almaden Lake would periodically discharge to Alamitos Creek. The DEIR concludes in Table 3.K-2 that the Project's impacts on water quality standards or waste discharge requirements are *less than significant with mitigation*. We could not find discussion in the DEIR of the potential effects associated with the discharge of Almaden Lake overflow water to Alamitos Creek via the new outlet pipe. Thus, information to support a finding of *less than significant with mitigation* for the project's potential impacts on water quality (Table 3.K-2) is lacking from the DEIR. We recommend the project develop an alternative method to manage overflow water from Almaden Lake that does not require discharge to Alamitos Creek. 9 cont.

In summary, the proposed project is a large and important restoration effort for the Guadalupe River watershed with appropriate goals that support the recovery of threatened CCC steelhead. Almaden Lake has deleterious impacts on native fish, and in combination with the effects of the Alamitos Diversion Dam, this 0.65 mile-long reach of stream warrants our attention and requires restoration. However, by subjectively limiting the footprint of the proposed project to the reach upstream of Coleman Road Bridge, Valley Water is missing a unique opportunity to apply an ecological restoration approach to long-standing habitat problems. By reconnecting Alamitos Creek and Guadalupe Creek to the upper Guadalupe River, natural processes (*i.e.*, sediment routing), habitat connectivity (*i.e.*, fish passage, spawning and rearing), water quality (*i.e.*, stream temperature), and the riparian corridor can be effectively restored to reach its full potential. We urge Valley Water to reconsider Option 8 as it would comprehensively accomplish the project's objectives related to fisheries habitat improvement and stream restoration. 10

If you have questions concerning these comments, please contact Andrew Trent at 707-578-8553 or by email andrew.trent@noaa.gov.

Sincerely,



Gary Stern
San Francisco Bay Branch Chief
North-Central Coast Office

cc: ARN File #151416WCR2020SR00034

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State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Bay Delta Region
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GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

February 4, 2020

Mr. Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
MichaelMartin@valleywater.org

Subject: Almaden Lake Improvement Project, Draft Environmental Impact Report, SCH #2014042040, Santa Clara County

Dear Mr. Martin:

The California Department of Fish and Wildlife (CDFW) received a Notice of Availability of a Draft Environmental Impact Report (EIR) from the Santa Clara Valley Water District (Valley Water) for the Almaden Lake Improvement Project (Project) on December 18, 2019 pursuant the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.; hereafter CEQA; Cal. Code Regs., § 15000 et seq.; hereafter CEQA Guidelines).

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that are within CDFW's area of expertise and relevant to its statutory responsibilities (Fish and Game Code, § 1802), and/or which are required to be approved by CDFW (CEQA Guidelines, §§ 15086, 15096 and 15204). We appreciate Valley Water extending the deadline for submitting comments on the draft EIR to February 4, 2020 (per email dated January 23, 2020).

CDFW ROLE

CDFW is a Trustee Agency with responsibility pursuant to CEQA for commenting on projects that could directly or indirectly impact biological resources. CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (i.e., biological resources). As a Trustee Agency, CDFW is responsible for providing, as available, biological expertise to review and comment upon environmental documents and impacts arising from project activities (CEQA Guidelines, § 15386; Fish and Game Code, § 1802).

CDFW is also considered a Responsible Agency if a project would require discretionary approval, such as permits issued under the California Endangered Species Act (CESA), the Native Plant Protection Act, the Lake and Streambed Alteration (LSA) Program, and other provisions of the Fish and Game Code that afford protection to the State's fish and wildlife trust resources. CDFW will act as a Responsible Agency because it anticipates issuing an LSA Agreement for Project activities that impact a stream (Fish and Game Code, §§ 1600 – 1616), specifically Alamitos Creek, Guadalupe Creek, and Guadalupe River. CDFW may also act as a Responsible Agency in issuing a CESA Incidental Take Permit (ITP) if Project activities result in

"take" of any species listed as candidate, threatened, or endangered pursuant to CESA (Fish and Game Code, § 2050 et seq.).

PROJECT DESCRIPTION

Background: Almaden Lake was created by gravel quarry operations, circa late 1940s to 1960. The off-stream quarry operation was located along the east side of Alamitos Creek and was comprised of two main large pits. After the gravel quarry operations ceased, heavy storm events eroded the levee that separated the creek from the quarry, resulting in discharge of creek waters into the former quarry area, creating Almaden Lake. Almaden Lake Park (Park) was developed through a partnership with the City of San Jose and Valley Water in the late 1970s. The 65-acre recreational Park includes the 32-acre Almaden Lake. However, due to historic mining activities upstream of Almaden Lake and the lake's deep bathymetry, mercury-laden sediment has become trapped in the lake, resulting in considerable buildup of mercury. Driven by anoxic conditions at the lake bottom, microbial buildup of mercury has resulted in high levels of methylmercury in water and fish. Almaden Lake is also subject to other water quality issues, including high temperature, high bacterial count, toxic algal blooms, and low dissolved oxygen.

Objective: Valley Water seeks to restore Alamitos Creek's function within the footprint of the Park in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within Almaden Lake, and minimizing impacts to existing recreational features within the Park.

Specific objectives of the draft EIR are as follows:

- Separate Alamitos Creek from Almaden Lake
- Reduce production of methylmercury and mercury in fish in Almaden Lake to meet applicable water quality objectives
- Remove potential lake entrainment and impacts to predatory fish to cold-water fish
- Improve temperature conditions for native fish
- Minimize impacts to existing recreation features

The objectives would be achieved by constructing a levee to separate Alamitos Creek from Almaden Lake, re-contouring the remaining lake bottom and capping it with clean clay fill, continuing to implement measures to manage and reduce future methylmercury production, establishing native vegetation, connecting the lake via pipeline to an imported water supply from the nearby Almaden Valley Pipeline, adding a pipeline connection between the lake and the Los Alamitos Percolation Pond, expanding the Park area into a small portion of the existing lake at the beach area, and stabilizing the existing island and construction a new additional island.

Location: The Project area includes the entirety of Almaden Lake and proposed pipeline corridors connecting Almaden Lake to the Almaden Valley Pipeline (upstream) and Los Alamitos Percolation Pond (downstream), as well as the southwestern portion of Almaden Lake Park for temporary staging areas. Almaden Lake Park is located within the southern portion of the City of San Jose, Santa Clara County. Almaden Lake and Alamitos Creek are within the

Guadalupe River Watershed and are tributaries of the Guadalupe River, which begins at the confluence of Guadalupe Creek and Alamitos Creek. Latitude: 37.240565, Longitude: -121.871467.

COMMENTS AND RECOMMENDATIONS

CDFW offers the below comments and recommendations to assist Valley Water in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. These comments and recommendations are based on the requirement for the environmental document to include the following information:

Project Description and Environmental Setting

Comment 1: Alamitos Creek and Almaden Lake Separation

The draft EIR states that the preferred alternative project would create a new 17-acre Almaden Lake capped with a clay liner to contain existing mercury laden sediments and would be fed by imported water from the Almaden Valley Pipeline (AVP). The lake would be a flow through system and would typically circulate 5 to 7.5 cubic feet per second (cfs) before being pumped to Los Alamitos Percolation Pond (Pond) for recharge operations or alternatively discharged to Alamitos Creek. The Project would restore 1,800 linear feet of Alamitos Creek, and create 11 acres of floodplain along the new stream channel. Alamitos flashboard dam would continue to impound 200 feet of the restored channel when operated.

Important details regarding future operations of the new lake facilities are not adequately described in the Project Description. CDFW recommends that additional information be provided and further assessment in Chapter 3 Environmental Setting, Impacts, and Mitigation be included. Key information that should be further described include water supply reliability to the new lake, frequency in which water from the new lake will be discharged to Alamitos Creek, and whether discharge will impact stream temperatures or seed stream with non-native predatory fish. Furthermore, the EIR should include an analysis of the continued operation of the Alamitos flashboard dam and how the operation is anticipated to affect steelhead and other native fish after the separation of Almaden Lake from Alamitos Creek. This assessment should include, but not be limited to, potential impacts to temperature, fish passage, and predation. 1

Comment 2: Flow Though System from AVP to Almaden Lake to Alamitos Percolation Pond

As previously mentioned, the preferred alternative would include a flow through system through Almaden Lake. The draft EIR states that horizontal directional drilling will occur to install a pipeline under Guadalupe Creek in order to pump water from the lake to the Pond. Impacts from this method were not clearly described in Chapter 3. This activity has the potential for "frac-out" (release of drilling fluid) into the creek, which would cause direct impacts to biological resources. The EIR should include a requirement for preparation of a frac-out plan, which would address all potential biological impacts and include a contingency plan with avoidance, minimization and mitigation measures in the event that a frac-out occurs. 2

For the pipeline that will connect the AVP to the lake, CDFW recommends that the EIR include a more complete description of this system. The draft EIR states that water will be gravity fed into the lake, but it is unclear whether flow of water will be controlled from the AVP to this new pipeline. 2 cont.

Comment 3: Fish Relocation

The draft EIR states that fish relocation would occur by using an electrofishing boat, backpack electrofishing, and seines. CDFW recommends that as many native fish as feasible be captured and relocated. If steelhead smolts or steelhead kelts are captured during the relocation effort, CDFW recommends placing them downstream in the Guadalupe River so they can migrate to San Francisco Bay. It may be preferable to put other species of native fish downstream as well, while steelhead parr and resident trout should be relocated upstream of the Project area. CDFW staff is available for coordination on the fish relocation plan prior to finalization of the EIR. 3

Comment 4: Project Phases and Dewatering

The draft EIR does not adequately describe all construction phases of the preferred alternative. Pages 2-37 and 2-38 state that dewatering of Alamitos Creek and the existing Almaden Lake would occur between June 1 and October 15 by installing a series of sheet piles along the future levee site to prevent creek flow from entering Almaden Lake. A cofferdam and pumps would also be installed to divert water around the work area and would be discharged to Alamitos Creek downstream of the lake. Additional pumps would then be used to drain isolated ponded water from the existing lake. Page 2-44 states that the configuration of the new lake and island will occur in the first summer of construction, while construction of the new creek channel and floodplain would occur in the second year of construction. It is unclear how volitional passage of fish will occur through the Project site during the winter between construction in years 1 and 2. It is also unclear whether sheet pile walls are required and whether it would be less impactful to dewater the Project area as a whole. CDFW recommends that the EIR include additional information and a more detailed dewatering plan to address the comments above. The dewatering plan should also include a figure showing where cofferdams, pipelines, baker tanks, and other structures or equipment will be placed for the diversion. The EIR should also provide a more thorough description of Project sequencing; Table 2-2 should be revised to indicate time windows by month and year for each phase of the Project. 4

Comment 5: Alamitos Creek Channel Restoration

An objective of the Project is to build a new Alamitos Creek channel and floodplain system in stable equilibrium. Page 2-46 states that with the preferred alternative Valley Water anticipates stream maintenance will be necessary, including removal of 5,000 cubic yards of sediment from the reconstructed floodplain and channel on a 10-year recurrence interval. CDFW believes that a channel requiring this level of maintenance is unlikely to provide the benefits stated in the draft EIR. With a new 11-acre floodplain, CDFW recommends that Valley Water strive to design a system capable of containing the 100-year flow and that will also allow for anticipated levels of sediment flux and aggradation. A detailed hydraulic model for the Project should be developed 5

that is capable of reasonably predicting sediment dynamics that will be observed in the restored stream channel and floodplain.

As part of the restoration objective of this Project, CDFW recommends that Valley Water consider inclusion of specific features that will improve habitat conditions for steelhead, such as large woody debris structures, and construction of secondary channels which are important habitats utilized by juvenile salmon and steelhead. San Francisco Estuary Institute's technical memorandum on *Historical Vegetation and Drainage Patterns in Western Santa Clara Valley* (Beller et al. 2010) is an important resource that should be considered to inform design concepts. CDFW recommends that the Project design team begin coordinating at each stage of design with CDFW staff and the National Marine Fisheries Service. We strongly believe that the design and implementation of projects of this scale are greatly facilitated when an iterative process is established that includes close coordination between scientists and engineers at the resource agencies and an experienced multi-disciplinary project design team. 5 cont.

Comment 6: Levee Construction

The draft EIR states that a levee would be constructed to separate the lake from the creek. The levee would be constructed using clean fill along with cement deep soil mixing (CDSM) at the base of the levee for reinforcement. The draft EIR also states that there is potential for California ground squirrel (*Otospermophilus beecheyi*) to occur within the Project area. Considering that levee maintenance typically includes fossorial mammal control to eliminate burrows as well as other maintenance activities that could result in potential impacts to biological resources, and sediment run-off into the stream, CDFW recommends that the draft EIR consider other options to construction of an earthen levee or further discuss how potential impacts to biological resources could be reduced from future maintenance activities. 6

Comment 7: Water Quality Monitoring

The draft EIR states that the preferred alternative would address and improve water quality such as methyl mercury accumulation within Almaden Lake, but it is unclear if or how improvements would occur downstream. The Project area of the preferred alternative encompasses Almaden Lake Park, a section of Alamitos Creek adjacent to the park, and a portion of Guadalupe Creek and the Los Alamitos Percolation Pond (part of the Alamitos diversion dam facility). Water quality monitoring should extend to the Alamitos flashboard dam, considering that it is closely linked to the preferred alternative and existing conditions at the dam may be similar to the lake. CDFW therefore recommends that the EIR include water quality monitoring not just within Almaden Lake but within Alamitos Creek and Guadalupe River (at the Alamitos diversion dam) as well. 7

Comment 8: Tree Removal and Impacts

The draft EIR states that 81 trees will be removed during Project construction under the preferred alternative and that a small portion of them occur within riparian habitat. CDFW recommends that a figure be included showing the location of the trees in relation to habitat 8

types. Additionally, the EIR should include an impacts table that identifies impacts specific to habitat types not just Project features (Table 3.D-2). 8 cont.

Comment 9: Nesting Bird and Roosting Bat Impacts, and Best Management Practices

As part of the preferred alternative, the draft EIR states that the existing island in the lake, which is nesting bird habitat for a number of species (e.g., herons and egrets), will be expanded. Part of the activities for the expansion include excavation, which could result in significant disturbance to nesting birds if conducted during the nesting bird season. The EIR should fully address how construction-related work will avoid take of nesting birds (pursuant to Fish and Game Code section 3503 and 3503.5). The EIR should also include more detailed information on the potential direct and indirect impacts to nesting, roosting, denning, perching, foraging and other habitat types for wildlife species that occur on the islands, including birds and bats. Furthermore, the EIR should describe potential impacts of dewatering the lake and interrupted feeding to bird species using this area, as well as impacts to other wildlife species dependent on the aquatic habitat. CDFW recommends that the EIR include effective avoidance, and minimization measures and compensatory mitigation for all impacts of the Project to nesting birds and other wildlife that cannot be completely avoided. 9

Table S-2 and within Chapter 3 describe the nesting bird season from February 1 to August 31. CDFW recommends that this information be updated to the timeframe of January 15 to September 1. Additionally, nesting bird surveys for passerines should include two surveys (Draft EIR states only one survey will be conducted). The first to be conducted at least within 7 days prior to the beginning of Project related activities, and an additional survey conducted within 48 hours prior to the start of Project related activities. If there is a lapse of 7 days (not 10 days) or longer in Project related activities, another focused survey should be conducted. Additional surveys for raptors may be necessary especially surveys earlier in the nesting season to document early signs of nesting when raptors are more conspicuous.

Comment 10: 30% Design Plans

CDFW appreciates that Valley Water submitted the 30% design plans for the preferred alternative project on January 29, 2020. At this time, we have not had a chance to review these plans in their entirety but will in the near future, and we look forward to coordinating and discussing these designs in further detail with Valley Water. At this time, CDFW recommends that clarification be provided and additional information be included in the EIR. The longitudinal profile provided indicates that when the flashboards are raised at the Alamitos flashboard dam, the water surface can be impounded to a maximum elevation of 192 feet, and a footnote on the profile indicates the water surface is typically maintained at 188 feet. Please provide further details and clarification on typical water surface level during operation of the dam. The draft EIR currently states that with the preferred alternative, only 200 feet of the restored channel would be impacted by operation of the flashboard dam. However, if water is impounded above 188 feet, a much greater length of the restored channel versus what is indicated in the draft EIR would be backwatered by the dam. 10

Alternatives

Comment 11: Option 8

Table 4-3 in Chapter 4 of the draft EIR lists 11 alternatives that were considered but rejected from consideration as viable alternatives for the Project. One of the alternatives that was rejected was Option 8. This alternative would consist of stream restoration that would be extended an additional 1,700 feet downstream of Coleman Road (approximately 3,500 linear feet total) compared to the preferred alternative. Alamitos Creek and the Guadalupe River would be restored to a more natural channel gradient by removing the Alamitos flashboard dam and replacing it with an alternative water diversion system. The draft EIR states that the reasons for rejecting Option 8 were for the following: it would not reduce the significant environmental impacts of the Project; it would be beyond the scope and budget provided by Valley Water's Board; it could lead to downstream loss of potentially jurisdictional waters of the U.S.; and there is uncertainty of the feasibility of an alternate diversion system. The environmental impacts described for Option 8 are related to construction activities; however, the draft EIR does not fully address and acknowledge the overall and long-term benefit of a reach-wide project versus a site-specific project.

CDFW believes that implementation of Option 8 would provide substantial environmental benefits greater than the preferred alternative analyzed in the draft EIR. These environmental benefits include:

- Restoration of a larger segment of Alamitos Creek and Guadalupe River and associated riparian areas and floodplain ecosystem. Conditions would greatly improve habitat for Central California Coast (CCC) steelhead trout (*Oncorhynchus mykiss*) and other native fish.
- Removal of the Alamitos flashboard dam would restore 1,700 feet of stream channel that currently becomes impounded when weir panels are raised. Similar to Almaden Lake, the impoundment created by the flashboard dam warms and impairs downstream water and provides habitat suitable for non-native predatory fish. This negatively impacts steelhead and other native fish. Removal of the flashboard dam would further improve conditions for steelhead and other native fish by improving water temperatures and reducing non-native predatory fish populations in the Project vicinity.
- Fish passage improvements with removal of the Alamitos flashboard dam. The Alamitos flashboard dam, despite having a fish ladder, negatively impacts fish passage. Passage through the reach with the flashboard dam is presumably most problematic for steelhead smolts due to the slack water, lack of cover in the channel, abundance of non-native predatory fish, and impaired temperature conditions that result from the operation of the flashboard dam. Also, during high flow conditions when the flashboards are typically removed, downstream migrating smolts and steelhead kelts are likely to pass the flashboard dam via spill over the dam face and energy dissipation structure at the base of the dam and not through the fish ladder. This could cause injury or mortality to migrating fish. A natural stream channel in this corridor would improve passage conditions for steelhead and other native fish in the watershed.

11

- Restoration of sediment transport and reduction of aggradation. The Alamitos flashboard dam impairs sediment movement in the Guadalupe River. Removing the flashboard dam would reduce aggradation in the reach upstream and restore sediment transport downstream which would enhance stream habitat conditions for native fish. This would also alleviate the need for channel maintenance and sediment removal periodically performed by Valley Water upstream of the existing flashboard dam to maintain stream channel capacity and conveyance.
- Valley Water would no longer have to maintain Alamitos flashboard dam and fishway. Valley Water would potentially be able to divert water more frequently from the Guadalupe River, since diversion could be operated during a wider period in the calendar year. Currently the flashboards at this facility are removed in the winter and diversion ceases since operation is a flood hazard during higher flows.

Taking into account these benefits, CDFW believes that Option 8, when weighed against alternatives considered in the draft EIR, is the environmentally superior alternative. Valley Water's reasons to reject Option 8 may be valid, but further evaluation is needed. With Option 8, the existing impoundment behind the flashboard dam would be restored to a more natural stream channel and floodplain ecosystem as mentioned previously.

Furthermore, although there may be uncertainty in the feasibility of an alternate diversion system, Valley Water may not have fully considered an alternate diversion system. Table 4-3 of the draft EIR lists a pumping station and fish screens as an alternative water diversion mechanism to divert water to Alamitos and Guadalupe recharge ponds. A gravity fed infiltration gallery may also be a feasible, cost effective and an environmentally superior mechanism capable of supplying diverted water to these recharge facilities. Option 8 could also be constructed in a two-phase approach, if needed. In the first phase, Alamitos Creek would be separated from Almaden Lake, and in the second phase, the profile of the stream channel and floodplain would be constructed to tie-in with removal of the Alamitos flashboard dam along with re-grading the channel profile in this section. CDFW is available to assist Valley Water in developing Option 8.

CDFW strongly recommends that Valley Water reconsider Option 8 as the preferred alternative for this Project. We recognize that this would cause a significant delay in implementing the Project with additional planning and potentially additional costs. The current preferred alternative would also benefit steelhead trout and other native fish as well as other biological resources, but restoring the entire Alamitos flashboard dam and Almaden Lake reach to a more natural riverine channel and floodplain ecosystem with restored sediment transport, would provide a much more substantial ecological benefit.

11 cont.

REGULATORY REQUIREMENTS

California Endangered Species Act
Please be advised that a CESA ITP must be obtained if the Project has the potential to result in "take" of plants or animals listed under CESA, either during construction or over the life of the Project. Issuance of a CESA ITP is subject to CEQA documentation; the CEQA document must specify impacts, mitigation measures, and a mitigation monitoring and reporting program. If the

12

Project will impact CESA listed species, early consultation is encouraged, as significant modification to the Project and mitigation measures may be required in order to obtain a CESA ITP. For more information on CESA and the ITP application process, please visit our website at: http://www.wildlife.ca.gov/Conservation/CESA.

CEQA requires a Mandatory Finding of Significance if a project is likely to substantially restrict the range or reduce the population of a threatened or endangered species. (Pub. Resources Code, §§ 21001, subd. (c), 21083; CEQA Guidelines, §§ 15380, 15064, and 15065). Impacts must be avoided or mitigated to less-than-significant levels unless the CEQA Lead Agency makes and supports Findings of Overriding Consideration (FOC). The CEQA Lead Agency's FOC does not eliminate the Project proponent's obligation to comply with CESA.

12 cont.

Lake and Streambed Alteration
CDFW requires an LSA Notification, pursuant to Fish and Game Code section1600 et. seq., for Project activities affecting lakes or streams and associated riparian habitat. Notification is required for any activity that may substantially divert or obstruct the natural flow; change or use material from the bed, channel, or bank including associated riparian or wetland resources; or deposit or dispose of material where it may pass into a river, lake or stream. Work within ephemeral streams, washes, watercourses with a subsurface flow, and floodplains are subject to notification requirements. CDFW will consider the CEQA document for the Project for issuance of the LSA Agreement. CDFW may not execute the final LSA Agreement (or ITP) until it has complied with CEQA as a Responsible Agency. CDFW recommends that Valley Water submit an LSA Notification when 60% design plans for the Project are prepared as well as encourages early consultation when 30% design plans are available.

13

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations. [Pub. Resources Code, § 21003, subd. (e)]. Accordingly, please report any special-status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data. The completed form can be submitted online or emailed to CNDDB at the following email address: cnddb@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Plants-and-Animals

14

FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary (Fish and Game Code, § 711.4; Pub. Resources Code, § 21089). Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW.

15

CONCLUSION AND FUTURE COORDINATION

CDFW appreciates the opportunity to comment on the draft EIR to assist Valley Water in identifying and mitigating Project impacts on biological resources. Questions regarding this letter or further coordination should be directed to Ms. Mayra Molina, Environmental Scientist, at (707) 428-2067 or Mayra.Molina@wildlife.ca.gov; or Ms. Brenda Blinn, Senior Environmental Scientist (Supervisory), at (707) 944-5541 or Brenda.Blinn@wildlife.ca.gov.

Sincerely,

Gregg Erickson
Regional Manager
Bay Delta Region

ec: State Clearinghouse #2014042041

Ms. Susan Glendening, San Francisco Regional Water Quality Control Board
susan.glendening@waterboards.ca.gov

Mr. Gary Stern, NOAA Fisheries
gary.stern@noaa.gov

Mr. Joseph Terry, U.S. Fish and Wildlife Service
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Mr. Patrick Samuel, California Trout
psamuel@caltrout.org

Ms. Stephanie Moreno, Guadalupe Coyote Resource Conservation District
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Guadalupe-Coyote
Resource Conservation District (GCRCD)
An independent special district of the State of California

888 N. 1st Street, Suite 204, San Jose, CA 95112
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January 27, 2020

Via Electronic Mail

Michael Martin
Valley Water
5750 Almaden Expressway
San José, CA 95118
michaelmartin@valleywater.org

RE: Comments on Almaden Lake Improvement Project DEIR

Dear Mr. Martin:

Guadalupe-Coyote Resource Conservation District (GCRCD) appreciates this opportunity to provide comments on the Almaden Lake Improvement Project Draft Environmental Impact Report (DEIR). GCRCD is an independent special district of the State of California dedicated to the conservation of natural resources in Santa Clara County, and has been active in watershed issues since the 1940s. The GCRCD has viewed the separation of Alamitos Creek from Lake Almaden as a priority project for protection of fisheries on the Guadalupe River for many years. As GCRCD staff and consultants have previously discussed with Valley Water staff, this project has the potential to improve water quality, native fish routing, sediment routing, riparian vegetation, and to provide other ecological benefits. Accordingly, we are very supportive of this project, subject to recommended modifications described below, as it could be the most important restoration project on the Guadalupe River to date to improve fisheries and channel conditions, particularly if the project is expanded to address the ecological and water quality problems caused by the Alamitos Drop Structure. 1

PROJECT OBJECTIVES

First, GCRCD is supportive of the Project Objectives stated in Section 2.C.3. In particular, we want to equally emphasize the objectives in the paragraph that follow the itemized objectives at the beginning of the section (fish passage/linkages, sediment routing, habitat restoration). Another objective that should be considered if South Bay Aqueduct (SBA) water is to be imported into the river corridor is to include "reduce potential introduction of non-native fish and vegetation."

Second, while this project is not yet under the umbrella of the One Water objectives, this project could and should fully align with the One Water objectives, specifically for the following five One Water objectives: 2

E: Expanded Floodplains

F: Supportive Stream Flows

G: Resilient Habitats

H: Climate Change

J: Community Engagement

2 cont.

As we will discuss below, we urge Valley Water to reconsider Option 8 as an environmentally superior alternative that addresses the project objectives and better satisfies the spirit and objectives of the One Water objectives.

RATIONALE FOR SUPPORT OF OPTION 8

As we have commented to the District in the past, the Guadalupe Creek – Alamitos Creek confluence is one of the most important reaches in the entire Guadalupe River system with respect to ecological function. In addition to the water quality issues associated with Almaden Lake, the Alamitos Drop Structure continues to cause other environmental impacts, including:

- The backwater caused by the Alamitos Drop Structure is a coarse sediment routing impediment that impairs the restoration strategy of the 2013 Gravel Augmentation Plan (ACOE 2013),
- Despite having a fish ladder, the drop structure can cause upstream fish passage impediments and/or delays,
- The drop structure likely reduces downstream steelhead (juveniles, smolts, and kelts) and Chinook salmon (juveniles, smolts) migration survival,
- The approximate 10 ft drop and concrete energy dissipation structure on the downstream side of the drop structure likely increases predation on juvenile and adult salmonids due to injury and/or disorientation, and
- The 10 ft elevational difference caused by the drop structure is a substantial perturbation in the gradient of the river through the reach (Almaden Lake and Alamitos Drop Structure).

The project will likely improve the site conditions at Almaden Lake, but it will miss substantial opportunities to greatly improve the reach (i.e., from Mazzone Drive Bridge to Highway 85 Bridge). One Water, the Gravel Augmentation Plan, and the current understanding of ecological restoration needs all mandate that we look beyond the site scale and consider the alternatives from a reach scale perspective. In the absence of this broader perspective, substantial cost-effective restoration opportunities will be forgone.

3

Of the alternatives considered in the DEIR, Option 8 best addresses improvements at this reach scale, and therefore better meets the objectives and spirit of One Water. Specific comments to support reconsideration of Option 8 include:

- The project should be evaluated in a larger context beyond the short reach from Coleman Road to Mazzone Drive. A long-term solution is needed for improving ecological function in the reach, including improve physical channel conditions, improving sediment routing, improving gravel supply and spawning/rearing habitat downstream of Alamitos Drop Structure, improving fish passage, reducing thermal loading on the stream, and reducing long-term maintenance to the District. A foundation for achieving these improvements is to restore a natural stream grade through the reach, not just the Almaden Lake site.
- Alamitos Drop Structure has caused sediment to accumulate at the confluence of Guadalupe Creek; this has caused maintenance needs for fish passage and flood conveyance under Almaden Expressway Bridge. Removal of Alamitos Drop Structure and installation of an

alternative diversion infrastructure will restore (steepen) the natural grade of the stream, and allow sediment and fish to pass freely through the reach.

- As noted in Xu (2017), the slope reduction caused by the Alamitos Drop Structure will cause sediment to deposit downstream of Coleman Road Bridge, as has been happening on Guadalupe Creek. Subtle changes in channel cross section without addressing the slope discontinuity will continue to cause sediment to deposit upstream of the Alamitos Drop Structure and starve downstream reaches of gravel (which is needed as described in the Gravel Augmentation Plan).
- Even though there is an adult fish ladder in place, removal of the Alamitos Drop Structure will facilitate better upstream fish passage for all native species by way of less passage delay, less predation risk, and less structure maintenance).
- Because most juvenile salmonid outmigrants and adult kelts move downstream during moderate to higher flows in the winter and early spring when water is spilling across the structure, these fish will likely have to pass over the drop structure and into the energy dissipation structures at the base of the structure (rather than go down the fish ladder). This will cause physical injury or mortality to these salmonids, and subject surviving fish to increased predation risk immediately downstream due to injury and/or disorientation.
- Restoring the natural grade of the stream through this reach will improve habitat resiliency via natural sediment routing, natural water surface fluctuations (rather than flashboard operations), more natural riparian vegetation establishment keyed into the underlying hydrology, and reduced water temperatures due to elimination of backwater habitats from the structure. In addition, downstream reaches will have greater resiliency due to restoration of full sediment routing through the reach. While the preferred alternative improves conditions at the Almaden Lake site, it does little to improve conditions downstream. Lastly, expanding the project to restore the reach should improve the Guadalupe River's resiliency to climate change, particularly with respect to changes in hydrology and sediment routing.

3 cont.

REBUTTAL TO DISMISSAL OF OPTION 8

The DEIR considers and rejects Option 8 from consideration for four reasons (Page 4-32), and each is discussed below.

- Reason #1: "Does not reduce any of the significant environmental impacts of the Project"- The approach of distinguishing between the Alternatives evaluation based on Long Term Environmental Impacts may be a valid approach, but for this project, it is not appropriate because there is only one long-term impact (Noise). Any of the alternatives except "no action" would fall under this exclusionary criterion because they all cause significant noise impacts. If all of the project objectives described in Section 2.C.3 and the One Water objectives are considered as selection criteria, Option 8 would likely be ranked the highest for those objectives (inclusive of sediment routing, fish passage/linkages, and habitat restoration). Furthermore, if these objectives were considered for the reach instead of the site (including downstream of Alamitos Drop Structure), Option 8 would further stand out as the environmentally preferable option.
- Reason #2: "Beyond the scope and budget provided by the Valley Water's Board"- The DEIR does not present the benefits of the project at the reach scale, and with respect to project and One Water objectives. Accordingly, we are concerned that this exclusionary criterion is being used to eliminate the environmentally preferable alternative without the Board having the opportunity to consider it.

4

- Reason #3: “Downstream loss of potentially jurisdictional Waters of the US”- This loss of jurisdictional water, if any, would be very small. More importantly, the ecological value of the post-project jurisdictional waters would be greatly enhanced (a functioning river corridor rather than a wide, flat water heater), and would almost certainly provide greater habitat benefits at the site and in downstream reaches than the Preferred Alternative.
- Reason #4 “Uncertainty about feasibility of alternative water diversion system”- There are numerous solutions to alternative water diversion systems. The uncertainty is due to lack of study, which can be remedied with a combination of value engineering planning, scoping, feasibility assessment, and design. For example, if Alamitos Drop Structure is removed, an engineered infiltration gallery could be installed under the stream channel at the upstream end of Almaden Lake site, and a gravity fed pipe could deliver needed water to the downstream percolation ponds. This would preclude the need for any fish screening, would eliminate adult fish migration delays or impediments, eliminate elevated downstream migration mortality and predation, allow coarse sediment to naturally route downstream and replenish gravel storage in downstream reaches, restore a riparian corridor through the reach, and reduce thermal exposure and heating in the reach. These alternative water diversion systems have been designed and implemented in many places (e.g., lower Tuolumne River infiltration gallery), and the uncertainty can be remedied with standard engineering study.

Again, if One Water and the additional objectives at the top of Page 4-3 were considered, Option 8 would likely be superior to all other alternatives based on the objectives. Lastly, an important consideration is the remaining environmental impacts of NOT remediating the impacts of the Alamitos Drop Structure. If the remedy of ongoing environmental impacts of the Alamitos Drop Structure were considered in the evaluation of alternatives, then Option 8 would again be a superior alternative because it is the only alternative that remedies the ecological impacts caused by the drop structure.

4 cont.

ADDITIONAL COMMENTS

If the project is going to periodically deliver SBA water into Almaden Lake and the percolation ponds, there needs to be preventative measures implemented to ensure that SBA water is isolated from the Guadalupe River to avoid more introduction of more non-native aquatic species and vegetation into the Guadalupe River corridor.

With the proposed SBA water delivery, it appears that the summer water diversion need should be reduced to <4.5 cfs, which can easily be accommodated by an infiltration gallery or other small-scale diversion strategy, further rendering the Alamitos Drop Structure to no longer be needed.

If Alamitos Drop Structure is not removed, water surface and shallow groundwater elevations will unnaturally fluctuate due to operation of the flashboards. These unnatural hydrologic fluctuations would likely impair the proposed riparian restoration in the Almaden Lake footprint, which may result in cycles of riparian establishment and desiccation in the project site. For example, vegetation that is established at higher elevations when the flashboards are installed may subsequently be desiccated and die when the flashboards are removed. Similarly, vegetation that is established lower in the channel when the flashboards are out could incur inundation mortality when the flashboards are re-installed. This artificial impact to vegetation would not occur if Option 8 was implemented.

5

Coordination with the Fish and Aquatic Habitat Collaborative Effort (FAHCE)

One of the overall management objectives for the Guadalupe Watershed under the FAHCE Agreement is to "restore and maintain healthy steelhead trout and salmon populations in the Guadalupe River

6

watershed, by providing ... Suitable spawning and rearing habitat for salmon below Calero and Almaden Dams to their confluence with Lake Almaden ...." FAHCE Settlement Agreement, Section 6.6.1. To this end, Valley Water has committed to complete and implement (following regulatory approvals) an Alamitos Creek Facilities Plan that includes two parts:

(A) Almaden Dam. The plan will evaluate alternatives to provide unimpeded passage, both upstream and downstream, at the existing dam and reservoir; eliminate the warming of water temperature in the reservoir; and eliminate or minimize the methylation of mercury in the sediments behind the dam. If a feasible alternative exists, the plan will recommend action, including design and construction schedules. The flow schedules stated above will be amended as appropriate on the basis of such removal or modification of Almaden Dam.

(B) Almaden Lake. The plan will evaluate alternatives, including a bypass channel, to isolate Almaden Lake from Alamitos Creek and Guadalupe Creek, and to screen flow entering Almaden Lake to prevent entrainment and impingement of steelhead trout and salmon. If a feasible alternative exists, the plan will recommend action, including design and construction schedules. The plan will be completed no later than seven years and one day after the Effective Date.

Id. at Section 6.6.2.1.3.3. We expect that Valley Water's implementation of the Proposed Project or one of the action alternatives will address the "Almaden Lake" part of the anticipated Alamitos Creek Facilities Plan. Accordingly, we request that Valley Water consider and select the alternative that best achieves the FAHCE objectives listed above. At a minimum, Valley Water should select an alternative that will not impede or preclude the restoration activities identified in the FAHCE Agreement. As Valley Water has proposed to implement this project outside of the FAHCE process as mitigation for construction of the Lower Berryessa flood control project, we understand that the extent to which the project satisfies Valley Water's commitments under the FAHCE Agreement will be addressed by the Initialing Parties at a future time.

6 cont.

SUMMARY

The GCRCD strongly encourages Valley Water to reconsider Option 8 as the Preferred Alternative for the reasons discussed above. Given the importance of this reach to the ecological function of the Guadalupe River, it is important to take advantage of the opportunity provided by the project to expand its spatial scope to consider the reach scale benefits and remedy the ecological impacts of the Alamitos Drop Structure. We realize that reconsidering the preferred Alternative could broaden the overall scope of the project and thus delay the project implementation, but given the expense of the current project, it would be cost-effective to also remedy the Alamitos Drop Structure as part of the same project. We are confident that GCRCD, the other resource agencies, and the NGOs would mobilize to assist the District in pursuing additional design, engineering, and funding assistance as needed.

If Valley Water chooses not to revisit Option 8 as the Preferred Alternative, then we urge you to modify the proposed project to accommodate future removal of Alamitos Drop Structure and installation of an alternative diversion structure. Specifically, divide the reach into two phases: Almaden Lake Isolation and channel restoration (Phase 1), and Alamitos Drop Structure remediation (Phase 2). Then modify the proposed Almaden Lake site design to accommodate Phase 2 implementation at a not-to-distant time. This would include:

7

- Installing an alternative diversion structure (e.g., infiltration gallery) as part of the Almaden Lake site design and mothball the new diversion structure for future use once Phase 2 is implemented (as was done on the lower Tuolumne River infiltration gallery).
- Designing Phase 1 with respect to a natural grade based on extending the project longitudinal profile to upstream of Mazzone Road and downstream to Blossom Hill Road (or Hwy 85). This doesn't imply that there will be Phase 2 construction over this reach, just that the design incorporates this slope (i.e., a reach-scale design perspective). Functionally, this would result in the stream channel design in the Almaden Lake footprint have a steeper slope (some of which would be in the Alamitos Drop Structure backwater until Phase 2 is I implemented).
- Work with the FAHCE agencies and NGO's to develop an ecologically friendly design for both Phases, and potentially collaborate on funding and/or design assistance for Phase 2.

7 cont.

We request that you either revisit Option 8 as the Preferred Alternative, or revise the current Almaden Lake site design to accommodate a Phase 2 remediation and restoration of the Alamitos Drop Structure. Thank you for considering these comments and recommendations, and for the opportunity to provide comments on this important project.

Sincerely yours,

/s/ Stephanie Moreno

Stephanie Moreno

Executive Director, GCRCD

California Water Boards

Gavin Newsom
Governor

Jared Blumenfeld
Secretary for
Environmental Protection

San Francisco Bay Regional Water Quality Control Board

Sent via electronic mail: No hard copy to follow

February 4, 2020

Santa Clara Valley Water District
Attn: Mr. Michael Martin
5750 Almaden Expressway
San Jose, CA 95118-3686
Email: michael.martin@valleywater.org

Subject: Comments on the Almaden Lake Improvement Project Draft Environmental Impact Report (State Clearinghouse No. 2014042041), Santa Clara County

Dear Mr. Martin:

San Francisco Bay Regional Water Quality Control Board (Water Board) staff reviewed the Draft Environmental Impact Report (DEIR) for the Almaden Lake Improvement Project prepared by the Santa Clara Valley Water District (Valley Water) pursuant to the California Environmental Quality Act (CEQA). Thank you for the opportunity to comment on the Project, and for the comment period extension to February 4, 2020. The proposed Project will require Clean Water Act (CWA) section 401 water quality certification (WQC) and waste discharge requirements (WDRs) from the Water Board because it entails excavating or filling about 1,092,000 cubic yards of sediment and soil (in addition to other materials) in jurisdictional wetlands and other waters of the U.S. and the State. As a responsible agency under CEQA, we offer the following comments on the DEIR. They are intended to support evaluation of the Project's potential significant environmental impacts, and the Water Board's future review of applications to authorize project construction.

The proposed Project will improve existing baseline conditions in Almaden Lake (Lake) and Alamitos Creek (Creek) by separating the Lake from the Creek. The anticipated benefits of the Project include enhanced water quality in the Lake, lower concentrations of mercury and methylmercury in the Lake, and improved fish passage for anadromous fish in the Creek. Alamitos Creek supports the federally Central California Coast steelhead trout (steelhead) (Oncorhynchus mykiss), and Chinook salmon (*Oncorhynchus tshawytscha*), and the Creek has the cold freshwater habitat, rare and endangered species, migration habitat, and spawning habitat, among its beneficial identified in the San Francisco Bay Water Quality Control Plan (Basin Plan). As explained in our comments below, the DEIR, however, has deficiencies pertaining to evaluation of the Project's benefits. In addition, the DEIR findings of significance, in some cases, are inconsistent with the rationale in the DEIR narrative. To help expedite our review of a future permit application, and could minimize the need for any supplemental environmental review pursuant to CEQA, we recommend the DEIR be revised

to address these concerns and the other issues in our comments.

Project Summary

Almaden Lake is a 32-acre in-channel impoundment on Alamitos Creek in the city of San Jose. The lake is part of the Almaden Lake Park, a 64-acre municipal recreational facility operated by the city of San Jose. The Project purpose is "to restore Alamitos Creek's function within the footprint of Almaden Lake Park in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint, and minimizing impacts to existing recreational features within the Park." To achieve these purposes, the proposed Project includes separating the Lake from the Creek by constructing a levee roughly along the historical Creek alignment (about 1,800 linear feet); re-contouring the lake bottom and shoreline and capping the Lake with clean fill; expanding the Park into the existing lake and beach areas; expanding the existing island and constructing a new island in the Lake; revegetating the area with native vegetation; constructing pipelines to supply the Lake with imported water by gravity from the Almaden Valley Pipeline, and a pipeline with an outlet structure and pump station to pump water from the Lake to the Los Alamitos Percolation Pond for groundwater recharge, and a third pipeline to pump water from the Lake to the Creek using the same aforementioned pump station.

Comments

Comment 1–Impacts to Federal and State Jurisdictional Wetlands and Other Waters

The proposed Project will result in a net permanent loss of 2.64 acres of jurisdictional wetlands or waters (including permanent loss of 15.44 acres of open waters but gain of 11.30 acres of riverine waters). The loss of surface area of jurisdictional waters results, in part, from to the conversion of open waters to riverine waters. We concur with the conclusion presented in the DEIR that filling the Lake to restore the Creek channel would provide a net environmental benefit based on the existing baseline. However, the DEIR discussion of the Project's benefits to aquatic habitat lack sufficient detail to clearly document that the Project's benefits to aquatic habitat will provide full mitigation for the Project's impacts to waters of the U.S. and of the State. Accordingly, the DEIR should be revised to include a more detailed discussion of the Project's net benefits to aquatic habitat. This discussion should include significance thresholds for assessing Project benefits to habitat for native fish, including Central California Coast steelhead. For example, significance thresholds for temperature may include temperature impacts on the life stages of steelhead (e.g., redds, juvenile rearing habitat, and adult migration to spawning beds). Measures to assess net benefits to native fish populations, such as life cycle population censuses, should also be discussed to confirm the Projects benefits to aquatic habitat. 1

We acknowledge that Table 3.D-2 includes an accounting of the net changes in acreage to the jurisdictional waters of the State, and identifies the changes as construction impacts that are less than significant. We recommend revising the DEIR to acknowledge this is a significant impact to jurisdictional waters under impact 3.K-3(iv)—*Project would substantially alter the existing drainage pattern of the site or area in a manner which could impede or*

redirect flows, and to propose appropriate mitigation for the loss of waters. The revised DEIR should then provide a clear demonstration of the Project's net benefits to jurisdictional waters.

In addition, although this is not strictly a CEQA review requirement, a Project must meet the California Wetlands Conservation Policy, also called the no net loss policy, for the Water Board to authorize WQC/WDRs for the Project. The Water Board adopted U.S. Environmental Protection Agency's (EPA's) Clean Water Act (CWA) section 404(b)(1) Guidelines (Guidelines) to evaluate whether a project, as proposed, constitutes the least environmentally damaging practicable alternative (LEDPA) that will achieve the basic project purpose. A project complies with the Guidelines if the following can be demonstrated, in order of sequence:

1. First, there is no practicable alternative to the proposed Project that would avoid or result in less adverse impacts to aquatic resources. Potential practicable alternatives include, but are not limited to, alternative available locations, modified designs, and/or reductions in size, configuration, or density;
2. Second, all practicable steps have been taken to minimize unavoidable adverse impacts to aquatic resources; and
3. Finally, after impacts have been avoided and minimized to the maximum extent practicable, compensatory mitigation for unavoidable loss of acreage, beneficial uses and aquatic resource functions is provided.

1 cont.

Once a project proponent has demonstrated that the proposed Project design is the LEDPA (e.g., that fill has been avoided and minimized to the maximum extent practicable), we will require appropriate compensatory mitigation for both temporary and permanent impacts to waters of the State. We will evaluate both the project and the proposed mitigation together to ensure that there will be no net loss of acreage and no net loss of functions. The accounting of losses and benefits to waters of the State could be used to inform the LEDPA analysis.

The proposed Project does not yet represent the LEDPA given that it results in a net loss of waters, and the discussion of Project benefits to aquatic habitat in the DEIR is not yet sufficient to establish that the Project will have a net benefit to aquatic habitat in jurisdictional waters. We recommend the DEIR be revised to provide a more detailed assessment of the Project's benefits to aquatic habitat, including performance metrics to document the Project's improvements to aquatic habitat. We encourage Valley Water to coordinate with the Water Board, the Californian Department of Fish and Wildlife, and the National Marine Fisheries Service, which is the federal agency responsible for protection of steelhead under the Federal ESA, to develop appropriate metrics assessing the Project's benefits to aquatic habitat; this coordination should expedite the permitting stage of the Project.

Comment 2–Clarification of Water Operations and Discharges from Lake to Creek

2

The Project is grounded in water operations for delivering water to the Los Alamitos Percolation Pond (Pond) for groundwater recharge, coupled with continuous flow-through in

the Lake to minimize stagnation and concentration of pollutants such as nutrients and bacteria, and to sustain dissolved oxygen at levels to suppress methylmecury production in the Lake. The Project's new pipelines and a pump station include transferring Lake water to the Creek when the Pond is unavailable to receive flow. However, the DEIR provided little information on transferring Lake water to the Creek, such as the anticipated frequency, duration, and flow rate (except for the pipeline size and pump station capacity). The DEIR should be revised with such details to clarify the potential for Lake discharges to the Creek, and should identify the discharge of Lake water to the Creek as a significant impact to Hydrology and Water Quality, impact 3.K-1, *The Project would violate water quality standards or waste discharge requirements, conflict with or obstruct implementation of the Basin Plan, or otherwise substantially degrade surface or groundwater quality*.

2 cont.

This is because the Lake water may be unsuitable for discharging to the Creek due to the same factors invoking the flow-through design, such as (but not limited to) elevated levels of bacteria, nutrients, and mercury. Discharges of Lake water may also be unsuitably warm and with dissolved oxygen levels that would not support the cold water habitat beneficial use of Alamitos Creek. In addition, Lake discharges may contain non-native biota that bypass screens. We recommend the DEIR include avoidance and minimization alternatives to discharging Lake water to the Creek, such as recirculating the Lake water within the Lake instead of discharging it to the Creek. Otherwise, a discharge permit separate from WDRs authorizing construction of the Project may be required. We urge Valley Water to consult with the Water Board to address this issue before finalizing the EIR.

Comment 3–Sediment Reuse and Imported Soil Fill

The DEIR should include a soil monitoring plan to determine the appropriate beneficial reuse or disposal options for any soil excavated in the Project site. The Water Board requires any soil fill to meet the criteria in the Water Board May 2000 staff report, *Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines*, or the most current revised version. Modifications to these procedures may be approved on a case by case basis, pending Valley Water's ability to demonstrate that the soil proposed for reuse and any imported soil fill material is unlikely to adversely impact beneficial uses of the jurisdictional wetlands and waters in the Project. For example, the DEIR indicates that beneficial reuse of excavated soil would be based on hazardous waste criteria or environmental screening level (ESL) criteria (DEIR pp. 2-38 – 2-40), which may be acceptable depending on the circumstances such as soil sampling frequencies. Finally, the DEIR, Appendix B, Table B-2 states an assumption that 80 percent of excavated sediment would be reused onsite, and 20 percent would need to be hauled offsite for disposal. This assumption must be verified with the appropriate analyses.

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Comment 4–Lake Dewatering and Creek Bypass Discharges

To construct the Project, the Lake would be completely drained. In addition, Alamitos Creek flow would be rerouted around the Project reach and discharged downstream from the lake, near the footbridge and Coleman Road overcrossing of the Creek. A complete dewatering and diversion plan will be required as part of the application for a WQC/WDRs, and we encourage Valley Water to include these in the EIR to ensure the considerations for staging,

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storage tanks, pipelines, pumps, wells, or other elements have been fully evaluated site conditions. The plan must include elements to contain, monitor, and treat the water, as appropriate, to prevent adverse water quality impacts. The dewatering and diversion plans will also need to include diagrams of alignments and locations of piping, cofferdams, pumps, and flow dissipaters, which need to be sized correctly for the anticipated flows to be managed. In addition, the plans must include a discharge monitoring plan to determine whether the dewatering and diversion flows meet the Basin Plan receiving water quality objectives, particularly for turbidity, dissolved oxygen, temperature, and pH. In addition, the plans must include continuation of the mercury TMDL water quality monitoring program until the Lake has been fully dewatered, and propose appropriate monitoring for total mercury and methylmercury associated with potential discharges during construction.

4 cont.

Comment 5–Sediment Transport

DEIR should include a detailed maintenance plan to explain how sediment is transported through the restored creek reach, and whether the Project will result in sediment deposition within the Project footprint, downstream along the reach from Coleman Avenue to the Alamitos flashboard dam, and further downstream of the dam. During the interagency meeting of January 22, 2020, NMFS voiced concerns that sediment accumulation is already a problem at the mouth of Guadalupe Creek, which is close to the downstream boundary of the Project, and that the Project would exacerbate that problem. In addition, the Project design accounts for an instream quarry pit close to the downstream boundary being readily filled in, suggesting the area will remain a depositional zone. In fact, the DEIR indicates 5,000 cubic yards of sediment will be removed once every 10 years from the Project reach. Please revise the DEIR to fully characterize this apparent indirect impact of the Project.

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Comment 6–Legacy Mercury Contamination

Numerous creeks and reservoirs in the Guadalupe River watershed, including Alamitos Creek and Almaden Lake, are impaired by mercury due to legacy mining activities. As a result, the Water Board developed a watershed-wide mercury management strategy under the Guadalupe River Watershed Total Maximum Daily Load (TMDL) implementation plan (Basin Plan, section 7.7.1). The DEIR should be revised to provide details on changes to mercury fate and transport anticipated by implementing the Project, and how compliance with the TMDL would be affected by the Project. To address this, we recommend the DEIR include the following assessments and mitigation measures and to include them as mitigation for the *Hazards and Hazardous Materials* impacts:

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a. *Clay Cap*. The Project includes constructing a clay cap on the lake bed to prevent migration of mercury and methylmercury into the lake's bottom substrate and water column. However, the DEIR indicates the clay cap will be 2.5 feet thick, while the Geotechnical investigation report (Appendix D) states that it would be no less than 5 feet thick, and would be 10 feet thick at the levee toe. Please revise the DEIR to explain this discrepancy in the clay cap thickness, and provide more details sufficient to show that the clay cap would be effective in preventing mercury and methylmercury from migrating upward through the cap.

b. *Dust evasion of dewatered reservoir.* The DEIR should address the potential for mercury-laden sediment fines to be picked up by wind during construction and pose a risk to workers, park users, nearby residents, and biota in the area.

c. *Monitoring to capture Project's effects on methylmecury levels.* Monitoring lake concentrations of mercury and methylmercury will need to continue to evaluate compliance with the TMDL.

d. *Non-native fish prevention.* The TMDL has mercury objectives based on fish tissue concentrations. The DEIR should include a plan to prevent introduction of non-native fish into the Lake after being re-filled. However, we recognize that non-native fish could be reintroduced by fish anglers, and by other means such as unwanted pet fish being released into the Lake. Therefore, we suggest the DEIR to include alternatives for an intensive public education and outreach effort to dissuade these practices.

6 cont.

Comment 7–Construction General Permit

We acknowledge and appreciate the DEIR indicates Valley Water would seek coverage under the statewide General Permit for Discharges of Storm Water Associated with Construction Activities (Order No. DWQ-2009-0009, as amended by Order Nos. 2010-0014-DWQ and 2012-006-DWQ) (Construction General Permit). The Construction General Permit requires a stormwater pollution prevention plan (SWPPP) that specifies all BMPs that will be used to avoid impacts to State wetlands and other waters. These considerations should be incorporated into project design as early in the planning phase as possible.

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Comment 8– Horizontal Directional Drilling Plan

The DEIR should be revised to include a Horizontal Directional Drilling Plan. The Water Board's permit authorizing construction of the Project will require this plan, and we urge Valley Water to include the plan in the DEIR to ensure the site conditions will accommodate the plan elements. The plan must include measures to prevent impacts during horizontal directional drilling, including proposed disposal locations or methods for excess sediment, proposed sediment reuse, and related information. The plan should also include a sketch of the approximate locations of drill entry and exit points; the proposed depth of bore(s) and a description of streambed conditions that supports the proposed depth of the bore; and the approximate length of the proposed bores. In addition, the plan for a future WQC/WDRs for the Project will also require additional details such as: type and size of boring equipment to be used; the estimated time to complete the bore; a list of lubricants and muds to be used; the name of the contractor and cell phone numbers of its construction supervisor and monitor; name of the environmental and biological monitor; site-specific monitoring conditions; monitoring protocols; and a containment and cleanup plan in the event of a discharge of drilling muds or other materials to a receiving water or to a location where they could be discharged to a receiving water. During construction, the Water Board will require Valley Water to monitor drill mud pressure and volume at all times during drilling to ensure that hydrofracture or other loss of drill muds has not occurred, and precautionary measures in the event of a sudden loss in pressure or volume, and steps including immediately halting the drilling operation, to ensure that drilling muds are not discharged to waters of the State.

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Comment 9–Post-construction Stormwater Management Plan

The Project includes features that will potentially be impervious, including the levee maintenance road, boat house, and boat ramps. The Project should be designed to minimize impervious surfaces, and where impervious surfaces are unavoidable, to incorporate nature-based stormwater treatment systems such as infiltration swales, to disconnect direct discharge of stormwater runoff to storm drains and waters of the State. Such designs and treatment systems should be consistent with the Santa Clara Valley Urban Runoff Pollution Prevention Program C.3 handbook (2016 or current version). The DEIR should be revised to demonstrate the appropriate site design and stormwater treatments are incorporated in the Project before finalizing the EIR. This is necessary to ensure the appropriate amount of space to accommodate onsite stormwater treatment systems is available. In addition, the DEIR should be revised to ensure that necessary measures to control trash are included, consistent with MRP Provision C.10. 9

Comment 10–Horizontal Directional Drilling Plan

The DEIR should be revised to include a Horizontal Directional Drilling Plan. The Water Board's permit authorizing construction of the Project will require this plan, and we urge Valley Water to include the plan in the DEIR to ensure the site conditions will accommodate the plan elements. The plan must include measures to prevent impacts during horizontal directional drilling, including proposed disposal locations or methods for excess sediment, proposed sediment reuse, and related information. The plan should also include a sketch of the approximate locations of drill entry and exit points; the proposed depth of bore(s) and a description of streambed conditions that supports the proposed depth of the bore; and the approximate length of the proposed bores. In addition, the plan for a future WQC/WDRs for the Project will also require additional details such as: type and size of boring equipment to be used; the estimated time to complete the bore; a list of lubricants and muds to be used; the name of the contractor and cell phone numbers of its construction supervisor and monitor; name of the environmental and biological monitor; site-specific monitoring conditions; monitoring protocols; and a containment and cleanup plan in the event of a discharge of drilling muds or other materials to a receiving water or to a location where they could be discharged to a receiving water. During construction, the Water Board will require Valley Water to monitor drill mud pressure and volume at all times during drilling to ensure that hydrofracture or other loss of drill muds has not occurred, and precautionary measures in the event of a sudden loss in pressure or volume, and steps including immediately halting the drilling operation, to ensure that drilling muds are not discharged to waters of the State. 10

Comment 11–Impacts from Hazardous Materials

For impacts to *Hazards and Hazardous Materials* (impacts 3.J-1, 3.J-2, and 3.J-5, and 5.K, addressing release of hazardous materials, release of contaminated soil, emergency response plan or emergency evacuation plan, and cumulative exposure to or release of hazardous materials), the DEIR's findings are less than significant (LS), even when avoidance and minimization measures will be used, and are necessary, to prevent adverse impact to the environment or public health and safety. CEQA defines mitigation to include avoidance and minimization of impacts, in addition to compensation for significant adverse 11

impacts that are unavoidable. Therefore the DEIR should be revised for these impacts with a finding of less than significant with mitigation (LSM).

Regarding *Hazards and Hazardous Materials* impact 3.J-4, *The Project is located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 or other listings, but would not create a significant hazard to the public or the environment*, the DEIR found the impact to be less than significant based on sealing the Lake bed with a clay cap to prevent mercury and methylmercury from migrating to the Lake substrate and water column, and the Project will remove and dispose of contaminated sediments. The Project will result in supplying the Lake with imported water from the State Water Project as well as other local sources. The water supply is expected to contain trace amounts of mercury, as is typical of most central California surface waters. Therefore, the Lake will remain under the Guadalupe River TMDL, and the DEIR should be revised for impact 3.J-4 to be LSM (see also Comment 6 pertaining to the Guadalupe River Mercury TMDL). 11 cont.

Comment 12–Santa Clara Valley Habitat Plan

Although the Water Board is not a party to the Santa Clara Valley Habitat Plan (VHP), the VHP includes impact avoidance and minimization measures that overlap with the Water Board's regulatory requirements and with Valley Water's standard BMPs. However, the VHP has not yet developed a mitigation program that meets the requirements of the Water Board. In some cases, mitigation projects implemented by the VHP on VHP property may provide appropriate mitigation for impacts authorized by Water Board permits. But Water Board permits require that a specific mitigation project be identified to provide appropriate compensation for impacts to waters of the State authorized by a Water Board permit. At this time, payment of a fee to the VHP does not provide acceptable mitigation for Water Board permits. 12

Closing

In conclusion, we support the Project because it will improve baseline conditions. We note, however, that the preferred Project will not resolve effects of the Alamitos flashboard dam downstream of the Project boundary, which results in backwater in the Project. The backwater may result in conditions that cannot support the cold freshwater habitat, fish migration, protection of rare and endangered species, and fish spawning beneficial uses in the Creek. We will continue to expect Valley Water to address those impacts in the future, and identify the opportunity to improve conditions in line with the project's stated goals. This would likely help expedite our review of a future permit application, and could minimize the need for any supplemental environmental review pursuant to CEQA. 13

Finally, thank you for convening an interagency meeting on January 22, 2020, to discuss the Project, and providing supplemental information not included in the DEIR (i.e., sediment transport technical memo, bankfull channel design memo; revised 30 percent design plan, vegetation plan, and cross sections). We were unable to timely review that information, but we urge Valley Water to incorporate it in the final EIR, with syntheses of how they inform the Project. 14

We look forward to continuing to work with you collaboratively with Valley Water on this important project. If you have any questions about our comments, please contact Susan Glendening of my staff by e-mail at susan.glendening@waterboards.ca.gov or via phone at (510) 622-2462.

Sincerely,



Nicole Fairley
Water Resources Control Engineer
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Michael Martin

Santa Clara Valley Water District

5750 Almaden Expressway

San Jose, CA 95118

January 31, 2020

RE: Comments on Almaden Lake Improvement Project DEIR

Dear Mr. Martin:

I am writing on behalf of California Trout and San Francisco Baykeeper to submit formal comments on the draft Environmental Impact Report for the proposed Almaden Lake Improvement Project (Project) by the Santa Clara Valley Water District (Water District). We appreciate the intent of this Project and the opportunity to voice our suggestions.

Background

During my three years of engagement at the Fish and Aquatic Habitat Collaborative Effort (FAHCE) Initialing Party and other technical meetings, field tours and conversations with Water District staff and other FAHCE IP members, it has become clear that restoring ecological function at Alamitos Drop Structure and Almaden Lake are the biggest feasible opportunities for restoring self-sustaining runs of federally threatened steelhead and Chinook salmon to the Guadalupe River watershed, which are our shared goals in the Settlement Agreement.

This Project and opportunity to remedy the Almaden Lake impediment and water quality and habitat issue is timely, as the latest population survey information for neighboring Coyote Creek has been dismal for nearly all sampling sites since 2015, indicating steelhead may already be ecologically extirpated from that watershed (J. Smith, 23 December 2019, "Fish Population and Environmental Sampling in 2014-2019 on Coyote Creek"). The broader statewide trends in steelhead are no less alarming, with Central California Coast steelhead facing extirpation throughout their range in the next century if current trends continue: "Central California Coast steelhead DPS populations are in long-term decline, and face extinction in the next 100 years without significant investments in monitoring, habitat restoration, and water management" (Moyle et al. 2017: https://watershed.ucdavis.edu/files/content/news/SOS%20II_Final.pdf).

This Project, if implemented thoughtfully by including Alamitos Drop Structure in its design, has the potential to significantly improve water quality, native fish migration, sediment routing, 1

riparian vegetation cover, stream temperatures, spawning gravel sorting, and benthic macroinvertebrate food production, as well as perhaps reducing the rate of methylation of mercury and its bioaccumulation in fishes and birds. To date, this represents the best opportunity for meaningful restoration of the Guadalupe River and to bolster steelhead and Chinook salmon survival and successful reproduction.

One of the overarching objectives for the Guadalupe River under the FAHCE Agreement is to "*restore and maintain healthy steelhead trout and salmon populations in the Guadalupe River watershed by providing… suitable spawning and rearing habitat for salmon below Calero and Almaden dams to their confluence with Lake Almaden*" (Section 6.6.1). The Water District has committed to developing an Alamitos Creek Facilities Plan that includes two parts:

(A) Almaden Dam. The plan will evaluate alternatives to provide unimpeded passage, both upstream and downstream, at the existing dam and reservoir; eliminate the warming of water temperature in the reservoir; and eliminate or minimize the methylation of mercury in the sediments behind the dam.

(B) Almaden Lake. The plan will evaluate alternatives, including a bypass channel, to isolate Almaden Lake from Alamitos Creek and Guadalupe Creek, and to screen flow entering Almaden Lake to prevent entrainment and impingement of steelhead trout and salmon.

Our hope is that the Project is intended to address the objectives outlined in the Alamitos Creek Facilities Plan for Almaden Lake as described above. We are sorely disappointed that the Water District has chosen to implement this Project unilaterally and outside of the FAHCE process. It goes against the spirit of the Settlement Agreement and the "collaborative" intent of the agreement entirely. Despite that, we encourage the Water District to fully develop, vet, and select an alternative that achieves FAHCE objectives, and to avoid selection of an alternative that potentially precludes, impedes, or delays any noted restoration needs identified in the FAHCE Settlement Agreement. This is why we stand with the Guadalupe Coyote RCD, National Marine Fisheries Service, California Department of Fish & Wildlife, South Bay Clean Creeks Coalition, and other stakeholders in supporting full development and careful re-consideration of Option 8, rather than selection of the current preferred alternative, as the environmentally superior alternative, as described below.

1 cont.

Comments on Proposed Project

The Guadalupe Creek – Alamitos Creek confluence is one of the most important reaches in the entire Guadalupe River system with respect to ecological function. In addition to the poor water quality and toxicity issues associated with Almaden Lake, the Alamitos Drop Structure continues to cause other environmental impacts, including:

- A backwater caused by the Alamitos Drop Structure acts as a coarse sediment routing impediment that impairs the restoration strategy of the 2013 Gravel Augmentation Plan and causes sediment to settle out, exacerbating methyl mercury loading and bioaccumulation;

2

- the drop structure can cause both upstream and downstream fish passage impediments and/or delays, which can lead to lethal or sublethal effects on fish;
- The drop structure likely reduces downstream steelhead (juveniles, smolts, and kelts) and Chinook salmon (juveniles, smolts) migration survival and/or spawning effectiveness due to delays or exclusion from upstream habitat; and
- The approximate 10-foot drop and concrete energy dissipation structure ("dragon's teeth") on the downstream side of the drop structure likely increases predation on juvenile and adult salmonids due to injury and/or disorientation.

2 cont.

Lack of Critical Detail in DEIR

The Project under the preferred alternative may improve the site conditions at Almaden Lake for native fishes in that they no longer have to swim through the lake, but the Project as designed and described does not have sufficient detail to determine potential benefits of the newly-engineered channel. Significant design details from the proposal are lacking:

- What will the new stream design look like in terms of depths, velocities, and stability/grade control? Will there be adequate cover, habitat complexity, shade, and riparian vegetation to keep the stream suitable for salmonids and other native fishes?
- Why is a new island being proposed in the lake, and will that only create new habitat for avian predators on fish that already frequent the site?
- Finally, with the flashboard dam in place on Alamitos Drop Structure, what will the upstream effect of backwatering be into the newly-designed stream reach adjacent to Almaden Lake, and how will it affect hydraulics and suitable habitat?

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On page S-2 under Project Alternatives, the draft EIR contends:

"Separating Alamitos Creek from Almaden Lake would restore Alamitos Creek's upstream and downstream connectivity within the Guadalupe River Watershed, restoring habitat linkages for native fish and threatened anadromous fish species, and would create a geomorphically stable creek channel that would improve sediment transport and restore natural creek functions. Therefore, the Project would help to restore and maintain healthy fish populations by improving fish habitat and passage in the creek channel."

If the Project is implemented as written under the preferred alternative, it will miss substantial opportunities to greatly improve the reach (i.e., from Mazzone Drive Bridge to Highway 85 Bridge) and the Guadalupe River from an ecological function perspective. One Water, the Gravel Augmentation Plan, and the current understanding of ecological restoration principles and geomorphological needs all mandate that we look beyond the site scale and consider the alternatives from a reach scale perspective, and to make the determination of whether the engineered creek channel would be geomorphically stable. By dealing with only a small portion of the reach (Almaden Lake) but ignoring the Alamitos Drop Structure downstream, the restoration effort is unlikely to achieve the stated goal of helping "to restore and maintain healthy fish populations by improving fish habitat" because it is unclear if "natural creek functions" would be restored, such as free flow of water, sediment, nutrients, prey resources, fish, etc. In

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the absence of this broader perspective, substantial cost-effective restoration opportunities will be forgone and significant time and resources will have been wasted while fish populations continue to decline in the watershed. 4 cont.

Critical Design Flaw Regarding Water Surface Elevation with Flashboard Dam in Place

There appears to be a critical design flaw in the design of the Project as written regarding the water surface elevation anticipated to be in the engineered stream channel during different operations at different times of the year. On the GCRCD tour of the lower portion of the Project site in January, Water District staff informed the group that the flashboard dams at the Alamitos Drop Structure are operated from mid-Spring through the winter. The DEIR confirms what we heard on page 2-4, Footnote 2:

> *"The flashboard dam is typically installed in April and removed in December to allow flow conveyance during winter storm events. No changes to flashboard operation would occur under the proposed Project."*

By this logic, for nine months of the year, the water surface elevation of Alamitos Creek in the Project area would be 192 feet with the flashboad dam in place, according to the Site Plan and Profile on page C-02. That surface water elevation would inundate the engineered channel in the Project site with backwatering from the flashboard dam, rendering the carefully designed pool and riffle sections useless for the majority of the year and making it function like a big pond as Almaden Lake currently does now. This design flaw highlights the problem with looking at this project at the site-specific scale rather than the reach scale, where operations of the Alamitos Drop Structure and flashboard dam immediately downstream of the Project site would completely undo the proposed fish habitat, stream temperature, sediment, and other proposed benefits for nine months of the year. The Draft EIR states that with the preferred alternative, only 200 feet of the restored channel would be impacted by operation of the flashboard dam. This is a huge miscalculation based on the Site Plan and Profile 30% design drawings, which indicate the extent of backwatering would extend well beyond the new engineered channel. Therefore, the preferred alternative does not provide an not an acceptable solution to the problems outlined in the Project need section of the DEIR, and is not even integrated with existing water operations that have been excluded from consideration in this DEIR. Further, it provides even more evidence for quickly and sufficiently remedying Alamitos Drop Structure and its associated flashboard dam so it does not undermine this current proposed Project. 5

Merits of Option 8 as Environmentally Superior Option

Of the alternatives considered in the DEIR, we agree with Guadalupe Coyote Resource Conservation District and the Resource Agencies that Option 8 best addresses improvements at this reach scale, and therefore better meets the objectives of restoring ecological function desired under FAHCE and also the spirit of the District's own One Water vision for management. While the preferred alternative will improve conditions in the project area for native fishes by disconnecting Alamitos Creek from the Almaden Lake, it does little to improve conditions downstream. Dealing only with the Lake while ignoring the drop structure immediately downstream - and hydraulically-connected and influential to the Project site when the flashboard 6

dam is in place – will on balance probably do little to meaningfully improve ecological function and create beneficial conditions for native fish. It would also be a significant missed opportunity to work with the group of FAHCE parties and other interested groups to seek a reach-wide solution in that critically important area that encompasses the confluence of Alamitos and Guadalupe Creeks, both for fish from the Guadalupe River basin and beyond.

6 cont.

Rebuttal of Water District's Premature and Flawed Dismissal of Option 8

The Water District mentions four primary reasons for dismissing Option 8 in the draft EIR:

- Reason #1: "Does not reduce any of the significant environmental impacts of the Project." There is only one long-term impact -noise- identified in the document associated with this Option. Any of the alternatives except "no action" would fall under this exclusionary criterion because they all cause significant noise impacts. If all the project objectives described in Section 2.C.3 and the One Water objectives are considered as selection criteria, Option 8 would likely be ranked the highest for meeting those objectives (inclusive of sediment routing, fish passage/linkages, and habitat restoration). Furthermore, if these objectives were considered for the reach instead of the limited site (including downstream of the Alamitos Drop Structure), Option 8 would further stand out as the environmentally preferable option.
- Reason #2: "Beyond the scope and budget provided by the Valley Water's Board." The DEIR does not present the benefits of the project at the reach scale, and with respect to project and One Water objectives. Accordingly, we are concerned that this exclusionary criterion is being used to eliminate the environmentally preferable alternative without the Board having the opportunity to fully understand its benefits, weigh the full costs of it versus other options and formally consider it. In addition, the cost of an alternative can't be used as a criterion to eliminate a potential option without fully developing that alternative to be considered on its merits under CEQA. When taking into account the long-term potential liability and real costs associated with long-term maintenance of the Alamitos Drop Structure, sediment removal near the Guadalupe Creek/Alamitos Creek confluence to ameliorate flood risk, and the potential mitigation credits gained by restoring ecological function under Option 8, it is worth fully developing that alternative for consideration. Further, full examination of a reach-scale solution such as Option 8 likely would open up cost-sharing opportunities through federal and/or state grant programs specifically developed to aid in the recovery of Chinook salmon and steelhead through fish passage improvement projects, of which we have a strong track record in securing, managing, and putting on the landscape across California.
- Reason #3: "Downstream loss of potentially jurisdictional Waters of the US." This loss of jurisdictional water, if any, would be very small. More importantly, the ecological value of the post-project jurisdictional waters would be greatly enhanced (a functioning river corridor rather than a wide, flat water heater), and would almost certainly provide greater habitat benefits at the site and in downstream reaches than the Preferred Alternative. Such benefits are deemed sufficient to offset the loss of jurisdictional waters under the United States Army Corps of Engineers Nationwide Permit Number 53 for removal of low-head dams: "Because the removal of the low-head dam will result in a net increase in ecological functions and

7

services provided by the stream, as a general rule compensatory mitigation is not required for activities authorized by this NWP."[1]

- Reason #4 "Uncertainty about feasibility of alternative water diversion system." There are numerous solutions to alternative water diversion systems, including an engineered infiltration gallery, which could be installed under the stream channel at the upstream end of Almaden Lake site, and a gravity fed pipe could deliver needed water to the downstream percolation ponds. This would preclude the need for any fish screening, would eliminate adult fish migration delays or impediments, eliminate elevated downstream migration mortality and predation, allow coarse sediment to naturally route downstream and replenish gravel storage in downstream reaches, restore a riparian corridor through the reach, and reduce thermal exposure and heating in the reach. These alternative water diversion systems have been designed and implemented in many places (e.g., lower Tuolumne River infiltration gallery).

7 cont.

Another important consideration is the remaining environmental impacts of *not* remediating the impacts of the Alamitos Drop Structure, such as the continued need for expensive and ineffective gravel augmentation downstream, downcutting and instability of the channel, and a significant lack of sediment in the southern portion of San Francisco Bay that is necessary to stem the advance of saltwater intrusion due to sea level rise from climate change. If the remedy of such costly ongoing environmental impacts of the Alamitos Drop Structure were adequately enumerated and considered in the evaluation of alternatives, then Option 8 would again be a superior alternative because it is the only alternative that remedies these ecological impacts.

Option 8 Provides a Pathway Forward and Promise of Success

California Trout and San Francisco Baykeeper encourage the Water District *as strongly as possible* to reconsider Option 8 as the Preferred Alternative for the reasons discussed above. Given the importance of this reach to the ecological function of the Guadalupe River, it is important to take advantage of the opportunity provided by the project to expand its spatial scope to consider the reach scale benefits and remedy the ecological impacts of the Alamitos Drop Structure. We realize that reconsidering the preferred Alternative could broaden the overall scope of the Project and thus delay implementation. However, given the expense of the current proposed Project and the risk of not getting it right (continued declines in population that may render them difficult to recover at all), it would be cost-effective and environmentally prudent as watershed stewards to also remedy the Alamitos Drop Structure as part of the same project. From both fiscally responsible and environmental stewardship perspectives, it is better to do one larger project correctly that looks at the function of the entire reach, than piecemeal two projects and risk not restoring ecological function quickly enough to benefit the already dwindling fish populations. California Trout is ready to mobilize to assist the District in pursuing additional design, engineering, and funding assistance as needed to facilitate Project implementation in a way that restores ecological function and serves FAHCE goals.

8

[1] https://www.swt.usace.army.mil/Portals/41/docs/missions/regulatory/NationwidePermits/Nationwide%20Permit%2053%20-%20Removal%20of%20Low-Head%20Dams.pdf?ver=2017-03-31-150712-113.

Process to Move Project Forward with Stakeholder Buy-In

If the Water District chooses not to revisit Option 8 as the Preferred Alternative, then we urge you to modify the Project to divide the reach into two phases: Almaden Lake Isolation and channel restoration (Phase 1), and Alamitos Drop Structure remediation and eventual removal (Phase 2). Such a plan, as described in the GCRCD comment letter, would include:

- Installing an alternative diversion structure (e.g., infiltration gallery – Tuolumne River, rubber bladder dam – Alameda Creek) as part of the Almaden Lake site design and mothball the new diversion structure for future use once Phase 2 is implemented (as was done on the lower Tuolumne River infiltration gallery).
- Designing Phase 1 with respect to a natural grade based on extending the project longitudinal profile to upstream of Mazzone Road and downstream to Blossom Hill Road (or Hwy 85). This doesn't imply that there will be Phase 2 construction over this reach, just that the design incorporates this slope (i.e., a reach-scale design perspective). Functionally, this would result in stream channel design in the Almaden Lake footprint that has a steeper slope (some of which would be in the Alamitos Drop Structure backwater until Phase 2 is implemented).
- Work with the FAHCE stakeholders and other NGO's to develop an ecologically friendly design for both Phases, and potentially collaborate on funding and/or design assistance for Phase 2. We request that you either revisit Option 8 as the Preferred Alternative, or revise the current Almaden Lake site design to accommodate a Phase 2 remediation and restoration of the Alamitos Drop Structure.

9

Thank you for considering these comments and recommendations, and for the opportunity to provide comments on this important project. We look forward to working with you on this important work to restore the Guadalupe River's ecological function and its native fishes while recognizing and balancing your needs for water conveyance and reliability.

Respectfully,

Patrick Samuel
Bay Area Program Manager
California Trout

Ben Eichenberg
Staff Attorney
San Francisco Baykeeper

CITIZENS COMMITTEE TO COMPLETE THE REFUGE

P.O. Box 23957, San Jose, CA 95153 650 493-5540 cccrrefuge@gmail.com www.BayRefuge.org

January 27, 2020 *Via email*

Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San José, CA 95118
MichaelMartin@valleywater.org.

RE: Almaden Lake Improvement Draft Environmental Impact Report

Dear Mr. Martin:

The Citizens Committee to Complete the Refuge (Citizens Committee) appreciates the opportunity to comment on the Almaden Lake Improvement Draft Environmental Impact Report (Project, DEIR) of Valley Water (District). Our organization's focus is on the Bay's wildlife, waters, and shoreline. As such it includes attention to existing and potential impacts of upstream watershed projects. The Guadalupe Watershed includes the Project and has a historical legacy of mercury contamination that still poses a threat to the health of the Bay, the fishing public, wildlife, and the success of the Don Edwards San Francisco Bay National Wildlife Refuge.

From an overall perspective, we are pleased that the District is proposing implementation of the Project. Its improvements appear likely to reduce the hazards of existing water quality conditions, to upgrade conditions for fish passage and to provide improved habitat conditions both in its footprint, in upstream and downstream channels and in the Bay. 1

The Project:

Currently, the 32-acre Almaden Lake, part of a 65-acre park operated by the City of San Jose, offers public hiking trails, biking, and pedal boating. The Lake includes a vegetated island and shoreline that provides habitat for many species of wildlife, there providing also for public enjoyment of nature.

The lake, as it exists, is an expansion and in-flow impoundment of Alamitos Creek. It is fed upstream by Alamitos Creek and has an outflow that feeds downstream Alamitos Creek above its merge into the Guadalupe River. Due to historic mining activities upstream and the lake's deep and uneven bathymetry, mercury-laden sediment has accumulated at the lake bottom. Resulting anoxic conditions in pockets of the lake depths promote microbial methylation of mercury that has produced high levels of methylmercury in water and fish. These conditions require remediation given TMDL requirements and the concerns that methylmercury bioaccumulation in fish imperils public health if consumed and is known to imperil reproductive success in piscivorous birds. The lake also has a number of other water quality issues, including high temperature, high bacteriological counts, potentially toxic algae blooms, and low-dissolved oxygen.

The existing configuration of the creek is a product of decades past when the creek was breached to fill an adjoining quarry pit, creating a lake with public recreation benefits including fishing and swimming. Water quality issues already mentioned have since ended and/or severely restricted such uses. At the same time that design extensively altered water and riverine conditions for salmonids that are dependent on the creek for multiple segments of migratory life cycles.

The Project proposes to restore and recreate a riverine environment by fully separating the creek from the lake to provide improved fish passage conditions. The lake itself would be reshaped to a smooth, even-bottomed bowl that will promote improved water circulation. Those changes will use soil fill with a sealant layer that will prevent existing deposits of mercury from continuing to be a source of the contaminant. Actions will also fill the westerly portion of the lake to recreate landscaped floodplain, land that will be usable acreage of the surrounding park. Within the lake, the existing island will remain and a second island is proposed, both to be vegetated as wildlife habitat. Creek banks and the lake shoreline are to be revegetated to provide benefits like habitat and shade. The levee along the creek will serve as a public trail.

Overall, this Project is appropriate in environmental improvement intent and will pursue complex implementation that we hope to see succeed. An outstanding concern is the downstream Alamitos Creek flash dam. It is not part of the Project footprint but in continued periodic redirection of water flow to percolation ponds, it will limit the success of the Alamitos Creek fish passage improvements. It will continue to disrupt fish migration and appears likely to limit reduction in water temperature. We urge Valley Water to consider improvements that can replace this creek obstruction. 2

Upper Berryessa Project Mitigation:

A unique function of the Project (DEIR p. I-2) is to fulfill off-site mitigation requirements of the District's Upper Berryessa Creek Flood Risk Management Project (Upper Berryessa Project), per an order of the Regional Water Quality Control Board (Water Board). As any mitigation action can apply only once, it is relevant that this DEIR identify which mitigation actions, or portions of actions, that apply to this Project or to the Upper Berryessa Project. Unfortunately the DEIR does not do so.

Through our prior reviews of the Upper Berryessa Project, we are familiar with that project's Water Board Order R2-2017-0014 of August 28, 2017, requiring mitigation not considered previously by that project and determined to not be feasible in that project's footprint. Similarly we reviewed and responded in comments to the Water Board's August 27, 2018 Rationale for Acceptance that would approve offsite fulfillment of Upper Berryessa mitigation as part of the Alamaden Lake Project. 3

While the DEIR acknowledges the Upper Berryessa mitigation requirements and references the same documents in introductory comments, it makes no further reference to it nor as to how the Almaden Lake Project satisfies mitigation for both projects. By that significant omission, the DEIR inadequately informs the reader. For instance, regarding discussion of impacts:

- Which mitigation requirements apply to only one of the projects or to both?
- For any mitigation that applies to both projects, by what measure(s) can a mitigation assign appropriate mitigation compensation to each project, such that the obligation of each project is met?

The omission of this information from both mitigation discussion and mitigation statements must be corrected.

In the Water Board's Rationale there is relavant discussion (Section E, page 9): "Mitigation Analysis to Compensate for Impacts of Both Almaden Lake and Upper Berryessa Creek Projects." Although written sometime before issuance of this DEIR and thereby tentative, the Water Board Rationale provides examples in Section E and elsewhere that may serve as guidance in assigning mitigation credits that demonstrate how the dual-project obligation is met.

3 cont.

As mentioned in the Rationale (p. 13), the final Almaden Lake Project "designs, monitoring of wetlands and performance criteria" will need to be acceptable to the Water Board. Perhaps DEIR solutions regarding assignment of mitigation, a unique and unusual requirement, might be best determined in consultation with the Water Board? As the preferred alternative and discussions of this DEIR are now available, guidance of the Rationale may also need adjustment. Consultation and resulting documents could be included in this DEIR, providing the needed explanations and assignment of compensatory mitigation.

The Citizens Committee to Complete the Refuge is a 501(c)(3) nonprofit corporation, fully run by volunteers. Arising from the citizen group that worked with Congressman Don Edwards to establish a National Wildlife Refuge in the South Bay in 1972, the organization focuses on protection of wetlands, wildlife and sensitive places all along our Bay shoreline and particularly as involves the Refuge.

For any followup need or future notices regarding this project, please contact this author at wildlifestewards@aol.com.

Sincerely,

Eileen McLaughlin
Board Member, CCCR

CC: Carin High and Gail Raabe, Co-Chairs, CCCR

Salmon and Steelhead Restoration Group

January 27, 2020

Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San José, CA 95118

RE: Comments on Almaden Lake Improvement Project DEIR

Dear Mr. Martin:

We are deeply concerned with the failure of the draft EIR to address offsite sanction relocation areas while the entire project is being completed or as project matures to a functional biological region. (In table Fisheries Resources Impact 3.E-1) 1

It does not address the new threatened or endangered species –the Green Sturgeon and White Sturgeon - now entering the watershed using the Almaden lake region; there is no mention of how SCVWD intends to accommodate these species during or after implementation. These species are highly affected from dredging operations because juveniles feed on zooplankton before shifting mostly to benthic macroinvertebrates. The draft EIR does not specify or mention a plan of protection in case they are encountered during netting activity. Relocation within upper streams is inadequate for these large species Sturgeon. Other filter feeders that live in deep water mussels.

Regarding the two large tributaries that come together (Los Alamitos Creek and Guadalupe Creek), the flow regime clearly shows that large species are able enter this region of the project. Both Sturgeon and steelhead entered during extreme drought years 2014 through 2015. Depth to pool ratios need to be stated in order to protect these species safely as flows come. 2

The document does not mention using an off-site sanctioned and patrolled location for holding these species, and which others can hold during summering seasons. Confining fish species without proving that these upper lower areas can accommodate them has not demonstrated or studied as the areas may already be in use by existing species. Relocation to upper or lower areas is not an option; both overcrowding and relocation to lower and upper reaches of the project may stress out these species due to the lack of food source that can only be found in the lake. Native species with enormous schools threaten fin shad, Roach minnow, other minnows species and California Sucker and many other will be in the millions. Other variables species will be found when netting activity takes place within the lake. SSRG believes there's a 75 % to 90% chance these species of Sturgeon will be found within netting activity; there's even a greatr possibility in trapping them

indefinitely in other two ponds. Netting activity must be done within two other ponds; EIR does not address these factors in stranding native and threatened species of fish in these other ponds.

2 cont.

It well known that Almaden Lake is fairly deep, and during the drought feeding flows from the Arroyo Calero Creek went subsurface before reaching Almaden Lake then resurfacing from the bottom of Almaden Lake.



Above: Photo March 9, 2014; little water still flowing making it to Almaden Lake. That kept the lake more than half way full during entire drought.



Above: Photo Sept 9, 2015 ; observing condition of Almaden Lake, looking from north to south at Coleman Road bridge going over Almaden Lake.

It is also well known Steelhead Rainbow Trout summer in the lake as temps are cooler from upwell water from the bottom the lake. People report angling from under Coleman Road Bridge and catching Steelhead rainbow Trout through the summer season. (This was reported by Educator Richard Tejeda).

There is no mention on how to migrate these factors. The proposed design is a poor design; excavation or refilling of new materials should be at least 85 to 90 ratio to cobble rock to allow the new channel to filter water up or down and laterally move water to other two ponds. Using compacted dirt soils will degrade functionality of natural streams that can moves flows up or down.

3

Lower project needed remedy from catastrophic failures in Reach 10 of Army Corp project from improper design width ratios and not enough beneficial material to keep a channel stable. Area was reconfigured with right width ration and gravel cobble fundamental to keep the entire river channel functional.



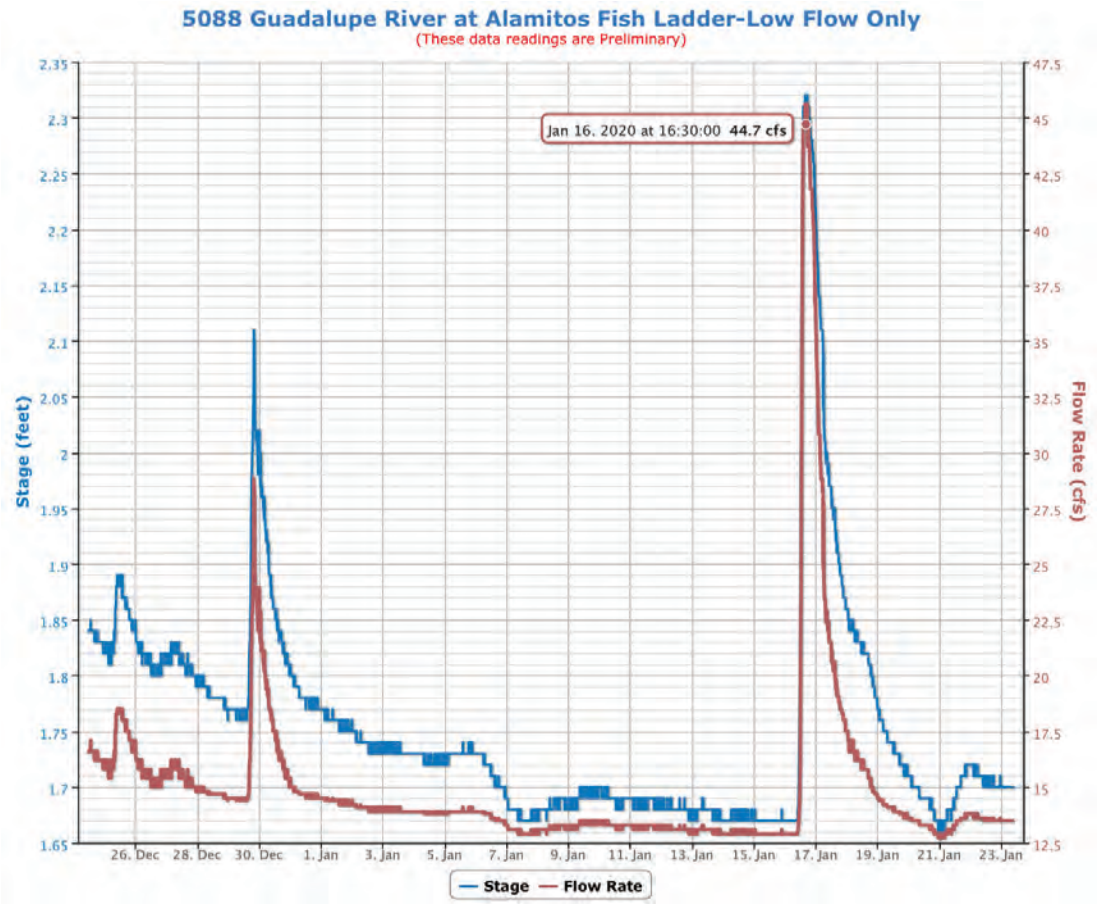
Above: Recent photo Jan 23, 2020 looking from and south from (SCVWD) projects below the Alamitos Drop structure that were implemented in 2018; areas are starving from the most fundamental material as the photo shows. No gravel and/or the lack of gravel cobble is causing same failures because using compacted soil or insufficient or missing materials is failing to keep the hold channel stable. Using soil and plants are insufficient as water erosion carries these soils to other successful projects downstream of Blossom Hill Road.

3 cont.



Above: Recent photo Jan 23, 2020; looking from and south from (SCVWD) projects below the Alamitos Drop structure that were implemented in 2018; areas are starving from the most fundamental material as the photo shows a dusting of cobble rock is mostly all gone down stream; while the main channel still has gravel, the banks are not stable.

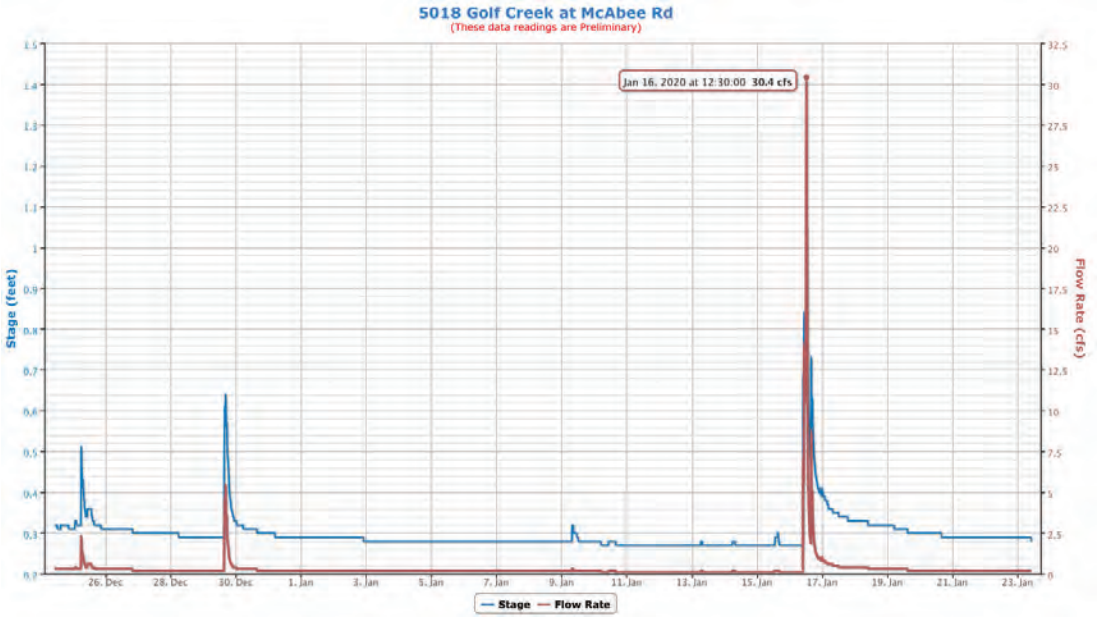
3 cont.



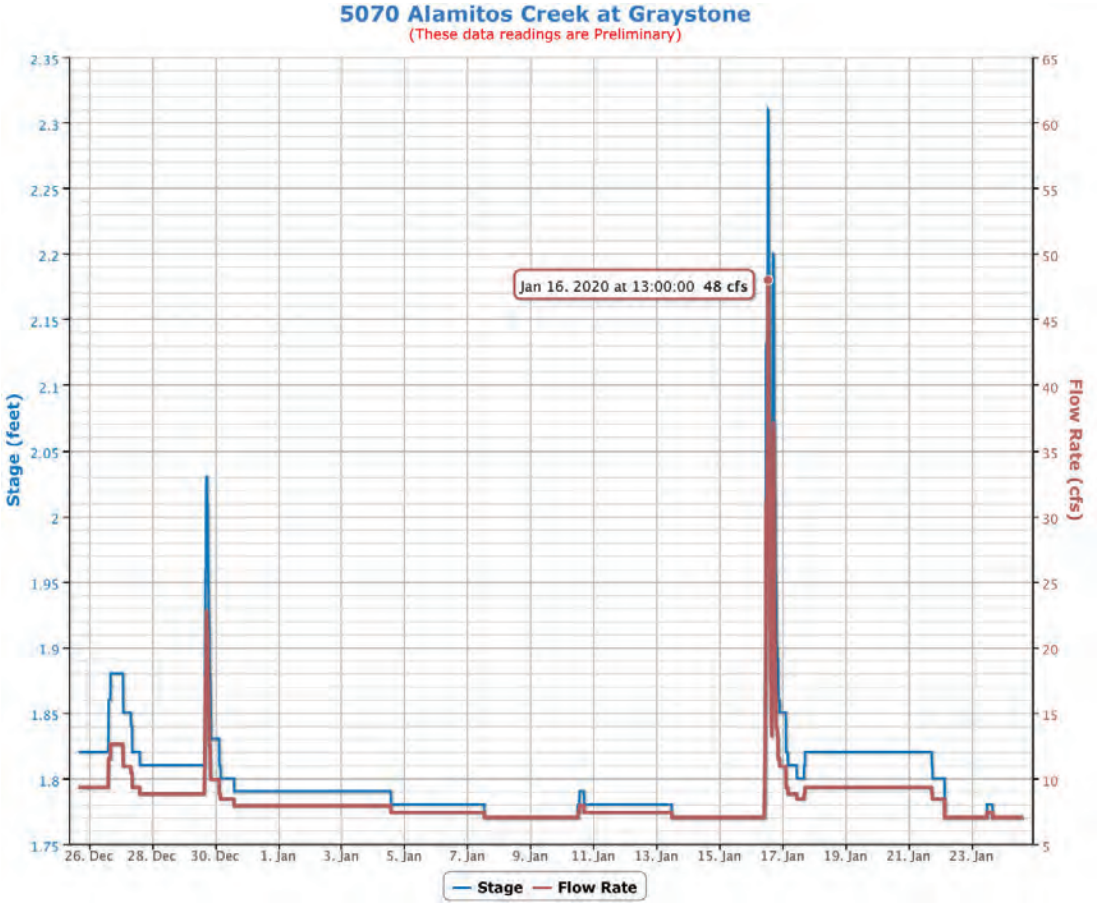
Above: 5088 Guadalupe River at Alamitos Fish Ladder show a 44.7 cfs after the light rain in Jan 17, 2020. While this can read flow rate, they are not very accurate because most of water flows go over the drop structure in big events.



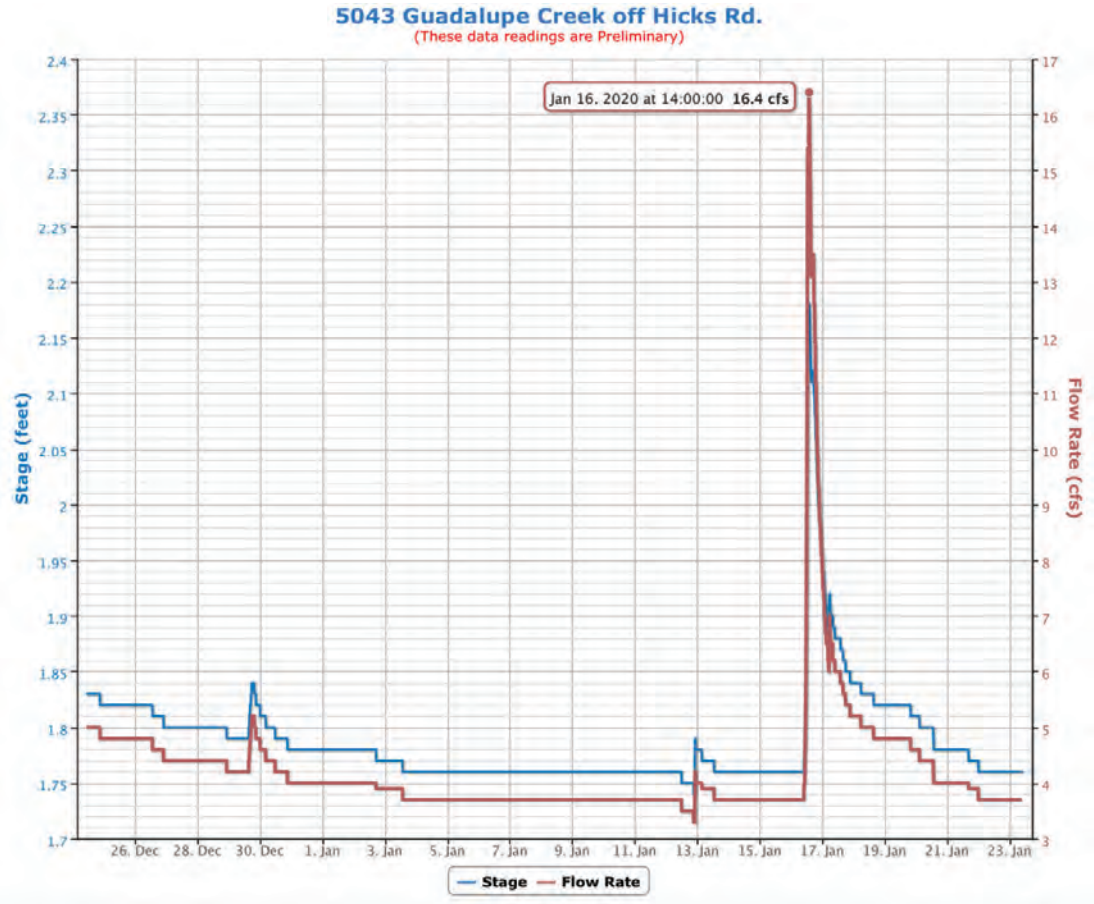
Above: Photo During Drought Feb 7, 2015; showing the Alamitos drop structure as most of the flow went over the structure. This was a February storm that drew in large Sturgeon above Ladder.



Above: 5018 Golf Creek gage in January 2020 show how flashing is sending 30 cfs during light rain.



Above: Alamitos Grey stone gage shows 48 cfs on Jan 17, 2020.



Above: Guadalupe Creek at Hick gage reading 16.4 cfs on Jan 17, 2020. In combined flow all gages should have read somewhere around 94cfs, and other influence from storm drain should have being well over 120 cfs. But yet the Alamitos gage only reads 44.7 cfs through the small rain.

Upper tributaries from the Almaden Lake project are very flashy; these other gages illustrate what happen between small rain storms. What will be down to alleviate possible other species strandings in the future? 4

Data that (SCVWD) should have collect during drought was not collected, so that is why I'm adding the data to this document. 5

The draft EIR fails to specify what new endangered or threatened new species can be found in Almaden Lake or to upper tributaries in same regions (Guadalupe Creek within the vicinity of Masson diversion and ladder in Santa Clara Valley Water District operations.) 6

SCVWD contracted services of a second party consultant Tucker Construction Inc. without having a certified Biologist to conducting netting/sagging operations within 7

(SCVWD) operations at Almaden Lake. Calling in (CDFW) special agents without calling or advising (SCVWD) scientific teams being present to record or report the take or relocation during June to July of year of 2015 of any new endangered or threatened species within Santa Clara Valley Water District managed operated regions.

7 cont.



Call to California Department Fish and Wildlife CALTIP log during June of 2015 to rescue one Green Sturgeon in drying pool above the Alamitos Fish Ladder where hundreds large carp are seen in photos. Thousands of smaller fish were netted and destroyed.

The County of Santa Clara Division of Vector Control's survey crews while controlling mosquitoes with mosquitoes fish found a large White Surgeon within this other location, Guadalupe Creek within 1 and 1/2 mile from Almaden Expressway Bridge (where it goes over Guadalupe Creek near down stream of Masson dam and fish ladder diversion from regions down where lateral up-welling flows come on incisions of deep pools on Guadalupe Creek from adjacent offsite recharge of several ponds.



Above: Photo 10-13-15; Guadalupe Creek downstream of Masson Dam and Fish Ladder within the changing condition deep pool incisions where large White Sturgeon had to be rescued during July of year 2015.

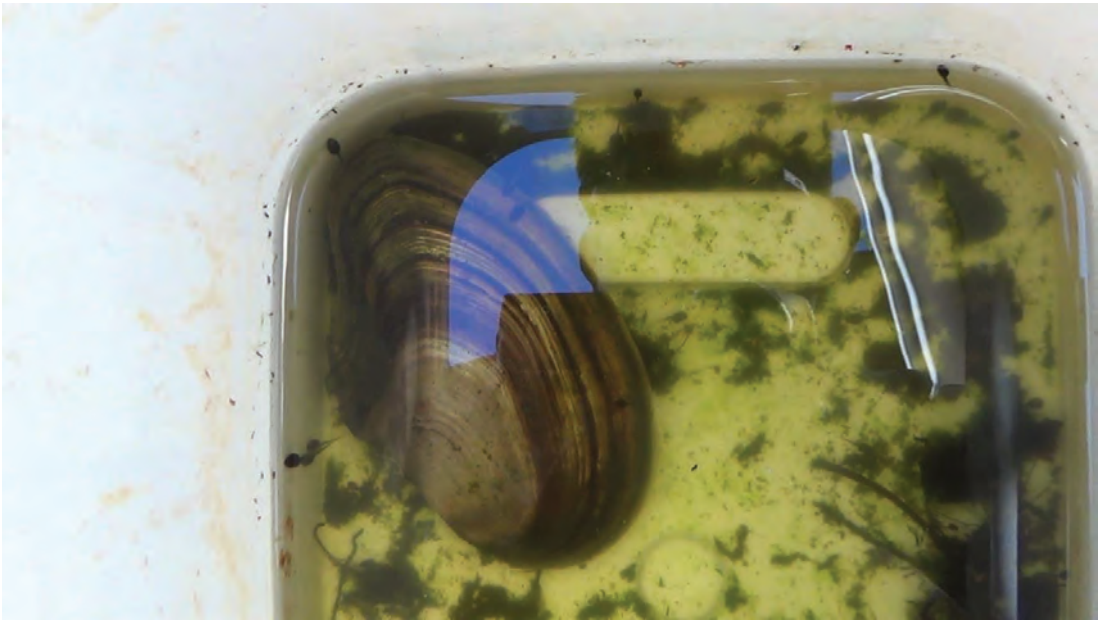


Above: Photo during drought 10-13-15; Guadalupe Creek downstream of Masson Dam and Fish Ladder within the changing condition deep pool incisions where large White Sturgeon had to be rescued during July of year 2015. Clearly show as water up-wells from main channel of Guadalupe Creek. There is no record on what has change occurred or was changed on reach of this project (migration project Guadalupe Creek for Lower Guadalupe River area between Camden Ave to Almaden Expressway reach 1 ½ mile of creek.)

County of Santa Clara Division of Vector Control Technicians called California Department Fish and Wildlife Service CALTIP Warden dispatch so they could relocate White Sturgeon from drying pools on Guadalupe Creek.

Also, the EIR document has no mention what protocol will be used in the event these other animals are found within netting activity. Some have been found in other regions of operations on Coyote Creek; two types of Crustacean where identified native Floater Mussel and Delta Version which are not native but provide valuable food source for Sturgeon. Both mussel are filter feeders and like muddy to sandy bottoms in deep water, and can be a primary source of food for sturgeon. Native Freshwater mussel were identified within the ponds of operation during the drought as the pond dried in year of 2015 in SCVWD. As SCVWD ponds went dry, no staff was sent to document or rescue organism from drying creek or drying SCVWD ponds.

8



Above: Photo of Floater Mussel from Coyote Creek indicator species found and rescued from (SCVWD) pond near 101 /85 Freeways.



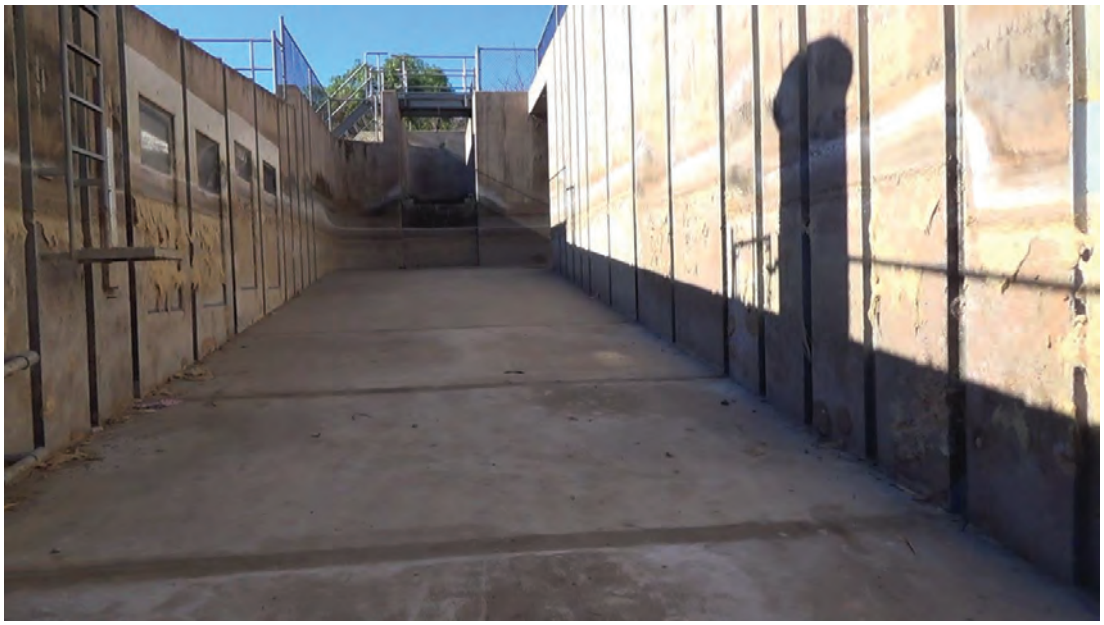
Above: Photo 03 -29-2014; Coyote creek went dry. Shows how large population were on Coyote Creek, also on Los Gatos Creek; in the Delta, non native version Asian clams, Corbicula fluminea can be used as indicators; when streams are having trouble they are first to go. These species can not be found on lower river systems Guadalupe or Coyote.

Those mussel species that sturgeon can eat whether invasive of not … will they be save or rescued too? The EIR has no mention of this factors. SSRG has recorded that many animals depend on these organisms, including Sturgeon, Water fowl, Raccoons, otters.

8 cont.

In conjunction with Almaden Lake Improvement Project, no information can be found on how the Alamitos Drop Structure and ladder will be used to control the influx on invasive species returning to these reach up stream of the Drop structure and the fish adder within the new proposed pools or new enhanced new channel. Clearly SCVWD knows that Almaden Lake to Alamitos Fish Ladder is overwhelmed with invasive species, especially below entrances and exit of the ladder. There also is a failure to open the education-viewing window so the public can observe from the view chamber within ladder what can be observed.

9



Above: Photo 09-19-2015; during drought walking Alamitos Fish ladder, you can see four window frames top left. An under water view chamber was never opened to the public. SSRG conducted an investigation on pond and stream operations, and filed several complaints during the drought 2014 through end of drought 2016 for failing to assemble Fish ladder between rainstorms.

That why our Salmon and Steelhead Restoration Group will be petitioning Santa Clara Valley Water District to have their consultants work directly with Salmon and Steelhead Restoration Group to bring in their expert consultant. SSRG collected data on fish killing areas that occured during the drought 2014 through 2016 in this proposed area and lower river regions of Guadalupe River, and hopes to help alleviate some of the causes for illegal take of species, and to help SCVWD develop an appropriate strategic plan or approach to oversee Santa Clara Valley Water District operation as third party consultant while operation take place. Removal of sediment and gravels by heavy machinery significantly impacts to a watershed.

10



Above: Photo taking April 16, 2019: Location Army Corp project 3 A, B, &C Coleman Avenue; Steelhead found up and down stream. Dredged to purposely destroy Army Corp Project while bring collapse tobiological habitat.

There is a track record for SCVWD for conducting these most serious operational tactics in 10 to 13 locations that can impair river system while endangered Steelhead and Chinook salmon are attempting to repopulate a watershed, and when knowing endangered and threatened fish are using rearing area within lower River system. SCVWD continues removing the most important fundamentals that can keep water cleaner and reduce invasive species from flourishing. To propose such operations in this immediate area where deep filter feeder and new species are found is not sane practice.

10 cont.

No method or process outlined to help the separation gravel and sediment as it's in transit, or as flow pushes them down to lower area to designated capture zone for targeted dredge. SCVWD constantly doing this type of operation is disturbing and altering a natural watershed. We stress that it's important to find other method, and to find other more appropriate techniques used by other experts from Wildland hydrology to separate gravel rock from sediments while in transport so they can be readily captured and available to be used again instead of starving depleted entire watershed from the most important fundamental gravel rock.

Salman and Steelhead Restoration Group would like to ask for additional time so we add very important comments. These other comment and data will be provided as they become readily available.

11

Sincerely,
Roger Castillo, Chairman
Salman and Steelhead Restoration Group
1596 Ivy Creek Circle, San Jose, CA 95121
408-238-2040 (O)
408-507-7852 (C)

Santa Clara County Creeks Coalition
Advocates for living streams

December 22, 2019

Mr. Michael Martin
Santa Clara Valley Water District
By email

RE: Comments on Almaden Lake Improvement Project

Dear Mr. Martin,

I am writing to make comments on the Lake Almaden Improvement Project EIR.

First I would like to commend the technical staff for the innovative and creative approach to reducing the percentage of the project footprint subject to the backwater from the flashboard dam at the Alamitos Drop Structure. This significantly enhances the potential for this project to realize the temperature reduction and habitat enhancement benefits of the project. 1

We trust that this same positivity and creativity will be brought to the fore in addressing the comments contained herein.

General Comments

The draft EIR does not comply with the minimum required elements for an EIR in the following ways:

1. It does not provide "sufficient information" to enable "meaningful evaluation" of the most important alternative to the proposed project, namely, the set of alternatives described in the letters to the District from NOAA Fisheries in 2014 and several environmental groups in January 2017. In fact, it dismisses this set of alternatives with euphemisms and "circular straw man arguments" rather than meaningful technical analysis. 2
2. It does not provide a discussion of the regulatory framework for temperature in streams, principally requirements of the Regional Water Board. Since temperature conditions are one of the most significant environmental stressors in the study area, and a source of significant controversy, the impact of the project on this parameter in terms of the regulatory framework needs a substantive analysis. 3
3. The EIR asserts that the project will reduce temperature without any quantitative analysis of how the project will impact thermal input nor impact resulting temperaturs in the study area. Nor does it include a summary of the readily available temperature data relevant to decision making for the project. Nor does it provide any estimate of the temperatures resulting from the project in the study area. So its claim of temperature reduction is unsupported by the EIR and contradicted by available temperature data not included in the EIR, especially the Jones and Stokes Temperature model of 2004 that made estimates of the impacts of temperature on the study area if the equivalent of Alternative 8 was not constructed.. 4

4. It asserts that the operation of the project will cause less than significant impacts, but contains no description of the flow regime, including the requirements of FAHCE and the requirements of the Streambed Alteration Agreement, nor the resulting temperatures in the study area. So the assertion is unsupported by the EIR. Since the channel is a new channel, the EIR needs to describe the flow and temperature conditions that will result from project operation. 5
5. It does not provide sufficient information to evaluate the methodology used to determine the width of the so-called low flow channel nor why the low flow channel wasn't sized to allow complete canopy cover to reduce temperatures in the stream. 6
6. The EIR has mischaracterized the findings of the Regional Board with respect to unaddressed impacts of the proposed project. Specifically, the Regional Board memo referred to in the EIR states that "Thus, although the Lake Project provides incremental benefits on a larger scale, it will not resolve all the constraints on beneficial uses in this reach due to the flashboard dam." And "Temperature monitoring in Alamitos Creek, within, upstream and downstream of the Lake Project's reach will be necessary to track whether the Lake Project improves temperature in that reach and to calibrate the temperature model.": and "The Alamitos Flashboard Dam will continue to be a passage barrier in the Guadalupe River because the impoundment results in water warmer than without the flashboard dam. Therefore, the flashboard dam limits the benefits of the Alamitos Creek Restoration Project… Therefore, the MMP (Mitigation and Monitoring Plan) should include details for how flow is managed,,," 7

The EIR needs to be amended to include:

1. A substantive discussion of the alternatives recommended by NMFS in 2014 and the variants on the NMFS recommendations provided by numerous environmental groups in 2017 and cost estimates for implementing them. 8
2. A substantive discussion of the calculation of the bankfull discharge and how that impacted the design of the trapezoidal channel the project recommends and why a totally shaded channel was not selected to minimize temperature impacts. 9
3. A discussion of the Regional Board's criteria for temperature impairment and the Regional Board's water quality objectives for temperature and a quantitative estimate of the project's resulting temperatures in light of those criteria, including a summary of existing temperature data collected during the Jones and Stokes 2004 study and more recent monitoring. 10
4. A discussion of the flow regime resulting from project implementation including the ability of the flow regime to achieve protection of beneficial uses. 11
5. A discussion of the findings of the Regional Board with respect to the unaddressed impacts of the flashboard dam and a proposed monitoring plan including a schedule for revising the model capable of predicting expected temperatures and comparing those with standards of impairment established by the Regional Board. 12

A. Excerpts from the Project Description, description of the requirements of CEQA and discussion of the Environmental Impact Analysis Below:

The introduction mentions that the project will:

- "promote the water quality objectives laid out by the San Francisco Bay Regional Water Quality Control Plan in its 2008 Basin Plan Amendment."
- "improve temperature conditions and reduce predation for native fish."
- "create a geomorphic ally stable channel that would improve sediment transport and restore natural creek functions".
- "restore and maintain healthy fish populations by improving fish habitat and passage in the creek channel"

The introduction also states the EIR is required to do the following and implies that the EIR has done so:

- "consider a range of potentially feasible alternatives that will foster informed decision making."
- "evaluate the comparative merits of the alternatives and include sufficient information about each alternative to allow meaningful evaluation, analysis and comparison with the impacts of the project".
- "identify areas of controversy known to the lead agency, including issues raised by agencies and the public"

The summary indicates the following consideration of impacts and conclusions about their significance:

- "Construction and operation of the project would have a substantial effect on special status native fish and their aquatic habitat in Almaden Lake and Alamitos Creek" and concludes that there will be "less than significant impact with mitigation" and that mitigation is limited to capture and relocation of fish" during construction.
- "Construction and operation of the Project would not substantially with the movement of or migration of native fish species, including CCCS Steelhead DPS" (that is to say, Central California Coast steelhead Distinct Population Segment) and concludes there will be less than significant impact.
- "The project would violate water quality standards or waste discharge requirements, conflict with or obstruct implementation of the Basin Plan, or otherwise substantially degrade surface or groundwater quality," and concludes there will be less than significant with mitigation and that mitigation is limited to control of turbidity during ocassional discharge of lake water to Alamitos Creek.

Chapter 1 states that the project will reduce water temperatures downstream of the project.

Chapter 3 defines the Study Area as "Analysis of biological resources addresses habitats within the Project footprint and adjacent habitats outside of these boundaries and uses the term "Study Area" to describe all of Almaden Lake and Park, small portions of Alamitos Creek and Guadalupe Creek, and upland staging areas." And "Adjacent to the Project site are a variety of land uses which are also included in the study area. North of the Project site is Coleman Road, the residential community of Almaden Lake Village, the Santa Clara Valley Water District (District) Headquarters as well as the Guadalupe River and Los Alamitos Percolation Pond." Hence the Project Area includes the Project Site at Almaden Lake and the areas downstream to the Alamitos Drop Structure.

B. Deficiencies with Regulatory Framework Discussion

The EIR mentions the Regional Water Quality Control Board's Basin Plan Amendment for Mercury adopted in 2008, but makes no mention of key water quality objectives for temperature contained in the Water Quality Control Plan. Given the temperature has been indicated as a significant stressor in the Study Area and Project Site and given that temperature reduction is considered an important benefit to the project, **the EIR should summarize the basin plan objectives for temperature and the recent March 2019 determination by the Regional Board that 17°C is the 7 day average not to be exceeded to be protective of beneficial uses related to the protection of steelhead trout.** 13

C. Unsupported Conclusion of "Less than significant impact"

The EIR has provided no data or analysis to support the conclusion that operation of the project will not violate water quality objectives and will not conflict with the Basin Plan. The EIR has not even described the requirements of the Basin Plan with respect to temperature nor has it even made mention of the Regional Board's March 2019 determination that 17°C as a 7 day average is the appropriate criteria for protection of steelhead trout. Neither has it summarized readily available temperature data nor compared it with the Regional Board's basin plan nor the 17°C criteria.

In fact, readily available temperature data not included in the EIR make the opposite conclusion. (See field data collected in the attached 2004, Jones and Stokes report,"Simulated Water Temperature of Bypassing Lake Almaden", and raw temperature data (attached) collected by the Water District subsequent to the Jones and Stokes study.) Those data show that conditions in the Study Area downstream of the Project Site are at levels that exceed Regional Board action levels and the Jones and Stokes report concludes that a fully shaded channel in the Project Site is insufficient to reduce temperatures to below those action levels unless the shaded channel is extended to the Alamitos Drop Structure. 14

The EIR should summarize the available temperature data and compare with the Regional Board's temperature criteria for protection of steelhead trout as well as the higher criteria suggested by Water District staff. Even though the Regional Board staff may have defacto exempted the project from compliance with the Basin Plan, that does not obviate the need for the EIR to objectively evaluate environmental conditions in comparison to Basin Plan temperature objectives and Regional Board action levels.

D. Inadequate Evalution of Alternatives
s

Alternative 8, the Expanded Creek Restoration Alternative, Was Not Analyzed in A Manner that Complies with CEQA Guidelines

The CEQA guidelines are explicit that alternatives need to be analyzed so as to **"**evaluate the comparative merits of the alternatives and include sufficient information about each alternative to allow meaningful evaluation, analysis and comparison with the impacts of the project."

The EIR does not meet that minimum threshold.

The essence of the Alternative 8 suggestions by NOAA Fisheries was the ponded backwater be replaced by a flowing stream. Though it did suggest removal of the dam, the District received letters from several environmental groups including the Sierra Club and the Creeks Coalition suggesting the same basic concept but achieving it by modifications to the drop structure, not its removal. These variants were presented to the SCVWD Board of Directors Capital Improvement Committee in January 2017 and project design staff were well aware of these letters. (See attached). 15

The essence of those alternatives was that the flashboard dam be discontinued so as to eliminate the ponded backwater, and conversion of the channel back into stream with riffles and shaded banks and habitat complexity to support steelhead trout. This variant of alternative 8 would also involve notching of the dam to promote coarse sediment movement.

There are numerous ways to achieve this, such as:

1. Creating an upstream catch basin to transfer reservoir releases into the percolation pond using a pipeline similar to that proposed to carry Lake Almaden water to the Percolation Ponds or in conjunction with that pipeline.
2. Designing the low flow channel so that flows that topped the banks of the low flow channel would flow into a catch basin for pumping to the percolation pond.
3. Diverting part of the flow released to the channel from the reservoirs into the New Lake Almaden for transfer to the perc pond
4. And for each of these sub alternatives, creating flow conditions that complied with the Streambed Alternation Agreement for flows to be maintained downstream of the Alamitos Drop Structure.

15 cont.

There alternatives warrant examination in order to the CEQA guidelines because of the significant environmental impacts that the EIR has also failed to examine.

The EIR needs to do the engineering analysis of these alternatives and provide those costs and operational impacts and environmental impacts so as to meet the CEQA guideline criteria of "meaningful evaluation and comparison with alternatives."

The EIR cites the following justification for rejecting Alternative 8:

1. Does not reduce any of the significant environmental impacts of the Project
2. Beyond the scope and budget provided by the District's Board
3. Downstream loss of potentially jurisdictional waters of the U.S.
4. Uncertainty about feasibility of alternate water diversion system

1. Significant environmental impacts

As discussed above, to support the assertion that Alternative 8 and its variants would not reduce any of the significant environmental impacts of the project, the EIR must analyze the temperature data in light of Regional Board Basin Plan criteria and sensitivities of steelhead trout to experienced temperatures and the Regional Board's threshold for protecting water quality needed to support steelhead trout life cycle. The EIR as written has not even discussed these issues, must less analyzed them.

16

2. Beyond the Authorized Scope and Budget

The statement that examining alternative 8 and its variants "is beyond the scope and budget provided by the Board" flies in "double speak" because the reasons that the scope and budget is beyond the Board authorized is because staff opposed the recommendations to include this within the scope. This is documented in the attached memo of Garth Hall in response to these recommendations made to the Board of Directors Capital Improvement Committee.

3. Downstream Loss of Jurisdictional Waters

The greatest loss of jurisdictional waters is the reduction of the footprint of Lake Almaden from 32 acres to 17 acres. The reduction of wetlands by converting the seasonal backwater to a stream as proposed by Alternative 8 and its variants is minor relative to the major impact within the project site. In both cases, the project can be self-mitigating by removing a major obstacle to the sustenance of steelhead trout and enhancing the value of the stream wetlands. In the Regional Board's findings that

they described the conversion of 11 acres of lake habitat to stream and riparian habitat - not as a loss of jurisdictional waters - but rather as the restoration of creek and riparian area. There is no reason to assume that the conversion of pond to creek and riparian habitat in the downstream reach would be treated any differently.t

4. **Uncertainty about feasibility of alternative water diversion system**

The EIR cites "uncertainty" in this context as if it were an intrinsic quality of the project site and study area. But in fact, the reason that uncertainty still exists is because staff have spent the last four years refusing to apply their engineering skills to address those uncertainties and come up with a coherent well throughout and substantiated engineering conceptual design, cost estimates, and impact analysis. The EIR is incomplete without a thorough examination of these alternatives. The EIR should address those uncertainties and come up with a stage 2 project design compatible with the current project.

16 cont.

D. Inadequate Description of Design Methodology for Hydrogeomorphic Design

The EIR asserts that the low flow channel constitutes a geomorphically stable channel and implies that the design is based, in part, on a calculation of bankfull discharge.

The resulting design does not resemble good hydrogeomorphic design but rather reflects traditional trapezoidal channel flood control and sediment transport design, a 25 foot bottom with sloping sides and a 45 top of bank width.. This is not appropriate for the restoration of ecological functions at Alamitos Creek in the project site or downstream. In fact, this is not consistent with the bankfull recommendations of the District's 2016 report cited in the EIR which recommended the following design.

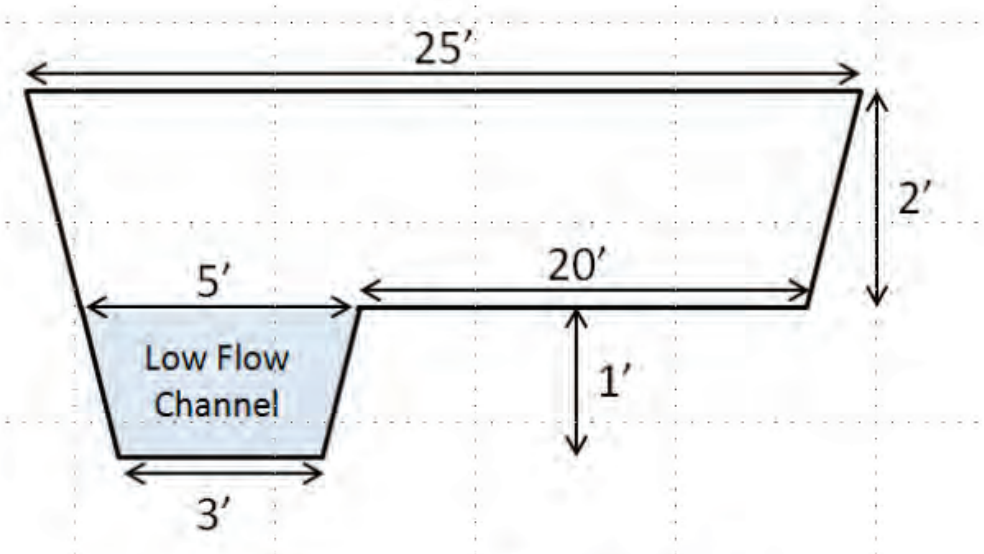


Figure 3: Recommended Channel Cross Section

17

Also, the EIR describes the channel as a shaded channel, but a narrow band of trees at the top of a 45 foot wide channel does not make for a shaded channel. **The EIR should clarify the width of the vegetation strip, the species of trees, the height of trees and estimate the percent canopy and the percent unshaded stream that the proposed design will achieve.**

The promise of "natural flood control" was that there would be shaded riparian low flow channel with a flood bench for flows that exceeded bankfull and a flood plain for the 100 year flood event.

The EIR should examine the costs and benefits and engineering basis for a smaller shaded low flow channel and flood bench and flood plain of appropriate elevation. The EIR should note the dimensions of the low flow channel upstream of the project (13'-20') and indicate whether or not this is indicative of the dimensions of the natural low flow channel.

17 cont.

From the cross section drawing in the EIR, the "riffle" cross section has a low flow channel 3-5' wide but the 35' wide on average channel that surrounds it is too large for a bankfull flow and would convey almost 1000 cfs at 5 feet per second velocity, rather than 600 cfs bankfull flow calculated by Larry Johmann some years ago. This bankfull channel would be about 3 feet deep and allow ford a flood plain and flood terrace.

Sincerely,

Richard McMurtry

Attachments:

1. JSA, 2004, Simulated Water Temperature Effects of Bypassing Lake Almaden
2. Temperature Data from Alamitos Creek (logger-daily_data_GR_DS_Drop.csv; logger_daily_data_AC_US.xlsx)
3. Memo of Garth Hall SCVWD to Capital Improvement Committee, Feb 27, 2017
4. RWQCB, Excerpts from Response to Comments re: Temperature Criteria for Impairment of Beneficial Uses for Listing of Los Gatos Creek, March 2019
5. RWQCB, Excerpts from Basin Plan re: Temperature Water Quality Objectives





January 27, 2020

Mr. Michael Martin
Valley Water
michaelmartin@valleywater.org

RE: Comments on Almaden Lake Improvement Project Draft EIR

Dear Mr. Martin,

The Sierra Club Loma Prieta Chapter (SCLP) and the Santa Clara Valley Audubon Society (SCVAS) thank the City of San Jose for the opportunity to review the Draft Environmental Impact Report (DEIR) for the Almaden Lake Improvement Project (Project). The Project's purposes are to restore Alamitos Creek's function within the footprint of Almaden Lake Park in order to improve physical habitat for steelhead and other anadromous fish, while improving water quality within the lake footprint, and minimizing impacts to existing recreational features within the Park.

SCVAS was founded in 1926, and is one of the largest National Audubon Society chapters in California. SCVAS' mission is to promote the enjoyment, understanding, and protection of birds and other wildlife by engaging people of all ages in birding, education, and conservation. SCVAS has engaged in the protection of burrowing owls and their habitat, other endangered (and common) species, and the protection of riparian and aquatic ecosystems for decades. Our members have a strong interest in projects that could impact biological resources.

The mission of the Sierra Club is to practice and promote the responsible use of the earth's ecosystems and resources; to educate and enlist humanity to protect and restore the quality of the natural and human environment; and to use all lawful means to carry out these objectives. The Loma Prieta Chapter conservation program works to proactively identify natural constraints and/or trends that will impact our local ecosystems and environment, and to present solutions for action.

Key elements under consideration include - Alamitos Creek restoration, Almaden Lake separation, open park area expansion, 2 island areas, Almaden Lake source water connection, Almaden Lake connection to Los Alamitos Percolation Pond, and native revegetation.

Our organizations have actively participated in the process that resulted in the current project design and mitigations. We commend the technical staff for the innovative and creative approach to reducing the dependency of the project on the operation of the flashboard dam, inclusion of nesting islands, and creation of upland vegetated area adjacent to the lake.

We remain concerned with the following elements of the EIR:

1. Nesting birds

Impact 3.D-1 proposes, "*Construction or operation of the Project could have a substantial effect on special-status birds, common nesting migratory birds and raptors, and roosting bats in the Study Area*". Mitigation Measure 3.D-1a focuses on removal of vegetation. However, on the Island and around Almaden Lake, many bird species nest on the ground, or in cavities in the ground - including Mallard, Canada Goose, Common Merganser, California Quail, Pied-billed Grebe, Spotted Sandpiper, American Coot, Common Moorhen, Northern Rough-winged Swallow, and Belted Kingfisher (Reference: *Breeding Bird Atlas of Santa Clara County. William Bousman, Santa Clara Valley Audubon Society, 2007*).

- Please provide mitigation for disturbance to nests of ground nesting species during construction.
- Please provide mitigation for impacts due to operation of the Project.
    - We recommend the prohibition of public access to the islands to avoid trampling and disturbance, and to mitigate potential impacts to roosting and nesting birds.
    - To minimize disturbance of resting or nesting birds, we recommend prohibition of boating within 50-yards of the island shores.
    - Please prohibit dogs on the levee between the new lake and Los Alamitos Creek.

1

2. Western Pond Turtle

DEIR Section 3.D Biological Resources under Project Setting (p. 3.D-2) mentions Western Pond Turtle as a species that may occur on the Project site. Avoidance and Minimization practice #91 proposes "...aquatic species will be netted at the drain outlet when draining reservoirs or ponds to surface waters. Captured native fish, native amphibians, and western pond turtles will be relocated if ecologically appropriate…". The EIR provides no mitigation for take of Western Pond Turtles.

To adequately mitigate for impact to individuals and to habitat, please:

- Provide a Western Pond Turtle relocation Plan.
- Provide training so project personnel can identify Western Pond Turtles and know what to do if they encounter a turtle.
- The Western Pond Turtle relocation Plan should include plans for the draining of the lake, including the potential need for pumping water. Also, during the draining of the last ⅓ of the water volume in the lake, consider daily sunrise survey for Pond Turtles along the entire perimeter of the lake to check for out-migrating Western Pond Turtles, or turtles digging hideouts or stuck in the mud.
- Mitigation and best practices to minimize impacts to Western pond turtles should include Habitat enhancements:
    - Submerged Wetland Benches. To provide cover, foraging, and nesting opportunities for wildlife, including hatchling and juvenile Western pond turtles, wetland benches can be integrated into the design of the levees and incorporated into the grading plans for the islands. These features should be at an optimum elevation/water surface depth for emergent wetland plant species to grow and propagate (approximately 0 to 2 feet below the water line). Wetland benches varying in width from approximately 8 feet to up to 30 feet from the islands will also serve to deter boats from approaching the islands and contribute to reducing erosion.
    - To benefit wildlife species such as pond turtles, waterfowl, and shorebirds, basking logs, basking zones, nesting zones, and raptor perches can be installed along the shoreline and on the islands. Pavers, stones, and gravel should be installed on roughly 6 foot by 10 feet sections along the islands shorelines to serve as turtle basking zones and to

2

facilitate maintenance access. Portions of the islands can be amended with sand to encourage turtle nesting.

2 cont.

3. Islands

- The expanded existing island is positioned very close to the trail and thus it is likely to become accessible to swimming predators including domestic dogs. Please widen the water channel between the island and the levee, even if that means that the island will be smaller.

3

4. Source of water and drought conditions

- The discussion of existing conditions does not explain the existing source of water to Almaden Lake or what percentage of that water is imported water compared to 100% imported water to be used for the Project. Please add this information. Also add some information about nutrients in imported water under Hydrology and Water Quality Operations Impacts on page 3.K-23 where it is not mentioned at all.
- Imported water from the Delta is high in nitrates and susceptible to Harmful Algal Blooms (HABs). Please discuss in project description the possible increase in nitrate concentrations (and any other water quality issues that may be introduced) due to the use of imported water, and discuss the impacts on water quality in the Lake (especially the potential for HABs) and mitigations needed in section 3.K Hydrology and Water Quality.
- The Project is projected to use 4,350 AFY of imported water. Please discuss the impact of this new demand on imported water in the project description or in Section 3.P Utilities and Service Systems as appropriate. How will this diversion of imported was impact the distribution of imported water and amount of imported water used (especially under drought conditions).
- Discuss the impact on the Project in the event of an extended drought up to 6-year drought period analyzed in the Water Supply Master Plan. How will this impact Lake levels, flow through the Lake, and therefore the ability of the project to meet objectives in this situation?

4

5. Impacts on Sycamore Terrace property

The identified staging area and pipeline location on the City's Sycamore Terrace property may impact the riparian corridor and significant vegetation and therefore we request the following changes to the analysis related to the use of this property in the DEIR as follows:

- On Figure 2-2b which shows the staging area boundaries, update the boundary of the Sycamore Terrace staging area so it doesn't not encroach into the 100' setback from top of bank. Also, include language In the project description stating that no trees will be removed on this property. There should be no reason to remove trees for a staging area (see Santa Clara Valley Habitat Plan Avoidance and Minimization Measures, #49).
- Figure 2-5 which shows the location of the pipeline from Almaden Lake to the Los Alamitos Percolation Pond going through the middle of at least one Sycamore grove. Figure 3.D-1a which shows the study area along the west edge of this property doesn't not appear to include the Sycamore grove. Please update Figure 2-5 to move the location of the pipeline into the study area shown in Figure 3.D-1a.
- The revegetation plan on Figure 2-6 does not include any mitigation planting on the Sycamore Terrace property. Please expand the revegetation plan to include this property and provide mitigation for the impacts caused by using this property as a staging area.
- In general the potential impacts to this property have not been adequately addressed in this DEIR. For example, will the use of the property as a staging substantially alter the drainage pattern and cause increased surface runoff or erosion? Please make sure to analyze and mitigate all impacts at the Sycamore Terrace property.

5

- All mitigations to prevent damage to the riparian habitat and floodplain and to water quality at this confluence point are essential. Please add language to clarify that all water quality and hydrology mitigations apply to equally to this property.
- The impacts of horizontal drilling at the Sycamore Terrace property need to be discussed and mitigated. Please provide information, analysis, and mitigation to respond to the following questions. What will be the impact of placing and operating the large drilling rig and where will the rig be placed? What will be the impact of drilling noise and vibration? How will materials or waters generated during drilling be stockpiled? Please include this boring project in the discussion of Best Management Practice WQ-12 since it is not currently mentioned there.

5 cont.

6. Lighting

Artificial night lighting has an adverse impact to all living things, and interferes with biological processes in wildlife, including fish and birds. The DEIR dismisses Project impacts due to light and glare since the Project has no development elements that would generate lighting during operations, and "Security lighting would not be required beyond what is already present in the Park." However, it is reasonable to expect that lighting will be part of the new planned park area, and that there will be an interest in the community to add sport lighting, lighted art, and other additional lighting features and elements.

- To avoid or minimize impacts of future lighting development, the EIR should specify that lighting will not permitted on the new levee, and require mitigation for potential future park lighting to prevent light trespass into habitat areas.

6

7. Tree removal

- More information is needed to fully analyze the impacts of tree removal. Please include a figure with a site plan showing all tree removals planned within the study area, including at the Sycamore Terrace staging area. Mitigation planting for tree Removal Plan should be provided on the Planting Plan, especially for the Sycamore Terrace property as indicated under #5 above.

7

8. Impacts of dewatering

- To minimize the impact of dewatering, add a mitigation measure provide retention and infiltration/evaporation outside of construction areas either onsite or at another location near the Project site. This approach meet will minimize stormwater runoff with Source Control as established in the City of San Jose Post-Construction Urban Runoff Management Policy (6-29).

8

9. Impacts of flashboard dam operation

- Please include in the project description how the interaction between Almaden Lake and the Los Alamitos Drop Structure will change as a result of the Project. Will the dammed water still back up into the Lake? Will it back up into the newly separated stream? If it will back up to these areas, please analyze the impacts and provide mitigation as appropriate. Alternative, explain how operation of the flashboard dam be changed to prevent any such impact.

9

10. Alternatives

Sierra Club has previously proposed an alternative that would include cessation of operation of the flashboard dam at the Alamitos Drop Structure, re-plumbing of the inflow to Alamitos Percolation Ponds, and conversion of the ponded backwater to a flowing stream. By creating a direct pipeline connection from Almaden Lake to the Los Alamitos Percolation Pond, the recommended Project begins to make this recommendation possible. Although that expanded project will not be included in this

10

project, we urge the District to pursue that project in the future, as recommended in a letter to the District from NOAA Fisheries in May 2014. 10 cont.

We thank you for the opportunity to provide comments on the Draft EIR.

Sincerely,

Katja Irvin

Katja Irvin
Conservation Committee co-chair
Sierra Club Loma Prieta Chapter

Shani Kleinhaus

Shani Kleinhaus, Ph.D.
Environmental Advocate
Santa Clara Valley Audubon Society

Comment Card

ALMADEN LAKE IMPROVEMENT PROJECT

Public Meeting, January 8, 2020

Valley Water

Please provide your contact information below

Name _____

Phone _____

Email _____

Address _____

_____

Attendees may fill out comment cards and leave them at the meeting site or mail them to Valley Water prior to January 27, 2020, the end of the Draft Environmental Impact Report review period.

Additional information on the report is available at the project website at:
https://www.valleywater.org/project-updates/almaden-lake-improvement-project

Mail: Michael Martin
Valley Water
5750 Almaden Expressway
San Jose, Ca. 95118-3686

ValleyWater.org Clean Water • Healthy Environment • Flood Protection

Please share your comments below.

The Draft Environmental Impact Report assesses potential environmental impacts resulting from construction and operation of the project, and suggests ways to minimize significant impacts.

The project seems to balance the need for remediation of the methylmercury, the desire of the public for water features, and the aim of preserving water resources for the future. The EIR seems to address the pertinent issues in practical and cost-effective ways. Valley Water has done a good job of keeping the community informed, and those efforts are appreciated.

1

1

Comments on ALMADEN LAKE IMPROVEMENT PROJECT Draft Environmental Impact Report
SCH# 2014042041

Summary of oral comments at Valley Water public hearing on January 8, 2020.

1. The EIR fails to evaluate the most obvious alternative project, which is to use a floating dredge to remove mercury-laden sediments form the lake bottom and transport them to an approved disposal site. Almaden Lake serves a useful purpose, as a sedimentation pond to remove mercury-laden sediments form the natural stream-bed environment. The lake can continue to serve that purpose in the future, as future mercury-laden sediments in the watershed are expected. 1
2. The EIR fails to address the environmental fate of mercury laden sediments, in the context of the entire watershed. By bypassing Almaden Lake with a newly constructed stream channel, the negative environmental consequences of mercury in the environment would simply.be moved downstream to new locations. 2
3. The EIR identifies historic mercury mining operations as a source of mercury-laden sediments, but fails to identify current ongoing sources, such as mine tailing piles and roads in Quicksilver Park, earth-moving operations at Guadalupe Dump, which intersect and expose historic mining shafts and tunnels, and other general construction. 3

Thank you for the opportunity to comment.
Dave Armstrong

Comment Card

ALMADEN LAKE IMPROVEMENT PROJECT

Public Meeting, January 8, 2020

Valley Water

Please provide your contact information below

Name Dave Armstrong

Phone

Email dharmstrong@gmail.com

Address

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Please share your comments below.

The Draft Environmental Impact Report assesses potential environmental impacts resulting from construction and operation of the project, and suggests ways to minimize significant impacts.

1. EIR failed to evaluate dredging alternative 1

2. EIR failed to evaluate impact of allowing mercury sediments downstream 2

From:	Deborah Barry
To:	Michael Martin
Subject:	Resident Questions/Comments re: Almaden Lake Improvement Project EIR (01/26/2020)
Date:	Sunday, January 26, 2020 8:48:06 PM

Hello Michael,

Appreciate your taking the time to consider the comments below. Having read the above EIR and followed this project for several years, below are my questions based on EIR Ch. 3.A.1 "Environmental Setting, Impacts, and Mitigation Measures".

1. Why is the lake area studied in the EIR so narrow? It focuses on restoring the Alamitos Creek and reconfiguring & cleaning the Almaden Lake Park, and more specifically on plants, flora, trees, fish, turtles, bats, and birds. However, the EIR does not take into account the surrounding natural habitat and animals (i.e. deer, mountain lions, bobcats, coyotes, and other wildlife) who reside in the area. Since I live across the street in the Lake View Terrace condo complex, I am very concerned that this will be a massive construction project that will go beyond its 2023 timeline. As it is, we have regular sightings of coyotes and bobcats at our complex. This project will be a major disruption that will impact all the wildlife surrounding our homes. Why didn't the EIR consider the impact on the surrounding natural habitat? 1 2 3

2. Why do this all project all at once? Why not break into two smaller phases? It seems that the original funding for the project started with restoring the Alamitos Creek. To reduce the impact on the wildlife and surrounding environment, why doesn't Valley Water do this in Phases? For example, Phase 1: Restore the Alamitos Creek; and, Phase 2: Consider options for cleaning up the Lake. At issue is that this is a 3-4 year construction project in an area densely populated and a main traffic throughway used by commuters at Coleman Road and Almaden Expressway. It would make more sense to break it down into two projects thereby minimizing impact on surrounding wildlife, and also, making the project budget & timeline more manageable. 4

3. Timeline and delays -- What contingencies are built-into the capital budget for unforeseen delays? For instance, if there is a drought in the next two years, will filling in the lake with water be delayed or the project be reassessed? Other delays that can impact the project: Valley Water budget cuts, change in SCVW board priorities, rain and weather halts construction, contracts are required to be rebid, and cost overruns result due to unforeseen factors. What contingencies does Valley Water have in place to keep this project aligned with its timeline? Or rather, have such delays been figured into the assumptions that support the project? 5

4. Almaden Lake and other options for removing Mercury contaminated sediment. The lake reconfiguration and clean-up sounds very complex, long, and a mess over multiple years –it also sounds like something Valley Water has not done before. Has Valley Water considered all of the options available to remove mercury sediment in the lake? As I understand, the two solar "bees" did have an impact in removing mercury. It seems like overkill to drain the lake, treat the bottom, and shrink it from 32 acres to 17 acres with construction and restoration taking place over a period of 3-4 years. What other, less impactful options were considered to clean up the lake? 6

5. Aesthetics – Lake Scenic Impacts & Mitigation Measures (3.A.3). During the public meeting January 8, 2020, the project manager said outright that the area would be disrupted by construction over several years, and there would follow a long restoration of the lake park. While the EIR does not take into consideration social or economic impacts, it is hard to separate these issues in the long-term clean-up of the lake. At the public meeting, one resident asked the question, "Where will the geese -that currently land on the lake islands – go during the construction period?" One of the project managers laughed and said "Nature will do what nature will do." Her response did not answer the resident's question. I figured she was just nervous because there is no answer. The lake park is essentially in Lake View Terrace condo owner's backyards. We do not want the geese or seagulls landing near LVT's creeks and ponds. This issue applies not just to LVT but to other condo and residential homes surround the lake. The Lake-portion of the EIR does not take into consideration environmental impacts to the surrounding area. Nor 7 8

did it seem like any budget had been established to help redirect “nature from doing what it will do”. The Lake-part of SC Valley Water’s project requires more study and a less impactful approach. Please reconsider other options for cleaning up the lake. 9

6. Long Term Almaden Lake Improvement Project Management. Having some experience in managing city construction projects, I can foresee this longterm project could turn into a nightmare for residents, businesses, commuters, and home owners --and ultimately Santa Clara Valley Water District and its Board. During the Jan 8th Public Meeting, I heard Councilman Johnny Khamis joke that he would not be in office when the project took place. I would guess that many of the people at SCVW who involved in this study and design, will also not be around to see how it ends. Will this project --capital budget, contractors, and timeline --be managed by the same project manager over the term of the project from beginning to construction to restoring plants and trees? 10 11

Thank you again for your time in considering and/or responding to these comments.

Sincerely,

Debby Barry
1605 La Terrace Circle
San Jose, CA 95123
Email: dbarry7@sbcglobal.net

My understanding of the project and its objectives is as follows:

That the creek will be isolated from the lake. Therefore, less mercury will enter the lake, and less fertilizer run-off will enter the lake from Almaden homeowners, thus reducing algae blooms in the lake.

That the bottom of the lake will be reshaped and capped, thereby containing the methylmercury within the lake bottom.

That the lake will be filled with water from an imported source.

That one of the project objectives is to "minimize impacts to existing recreational features."

My question is: why is there no accommodation for a new beach to replace the existing one that will be lost and no accommodation for swimming, given all of the aforementioned improvements that protect swimmers' health?

Since the bottom of the lake is to be reshaped anyway, it could be done with the appropriate gradients to accommodate a new beach and swimmers.

1

Although swimming at the lake is a City of San Jose responsibility, can any of you answer my question?

Thank you for your kind attention.

William Bernard
6726 Wortning Ct., San Jose, 95120
408-268-5622
wmrbernard@yahoo.com

Comment Card

ALMADEN LAKE IMPROVEMENT PROJECT

Public Meeting, January 8, 2020

Valley Water

Please provide your contact information below

Name Helen Brock

Phone 408-268-2876

Email jorjapeach2@comcast.net

Address 6675 Mt Hope Dr
San Jose, CA 95120

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Mail: Michael Martin
Valley Water
5750 Almaden Expressway
San Jose, Ca. 95118-3686

Additional information on the report is available at the project website at:
https://www.valleywater.org/project-updates/almaden-lake-improvement-project

Please share your comments below.

The Draft Environmental Impact Report assesses potential environmental impacts resulting from construction and operation of the project, and suggests ways to minimize significant impacts.

Thank you for your comprehensive presentation to the community regarding the proposed improvements to Almaden Lake.

My only concern regards project cost:

1) Does Valley Water already have the 36 Million Dollar cost set aside or will citizens be surcharged for same? 1

2) What assurance do we have that entire project will be completed? 2

From: Steve Conaway <steve.conaway@outlook.com>
Sent: Wednesday, January 8, 2020 3:47 PM
To: Michael Martin
Subject: Almaden Lake Improvement Project

I do not approve spending $4 million to ruin our lake and provide dubious path for spawning steelhead. 1

Keep in mind that there's a small vocal minority of people that favor fish over people. The salient majority are really going to be pissed if you approve this project.

Steve

From: Ray Copeland <ray_copeland@att.net>
Sent: Tuesday, January 7, 2020 10:27 AM
To: Michael Martin
Subject: Opposed to Almaden Lake Refill Plan

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Comment Card

ALMADEN LAKE IMPROVEMENT PROJECT

Public Meeting, January 8, 2020

Valley Water

Please provide your contact information below

Name JEFF DANIELS

Phone 408-794-1944

Email jeff.daniels@sanjoseca.gov.
CSJ-DOT

Address 1404 Mabury Road

San Jose, CA. 95133

Attendees may fill out comment cards and leave them at the meeting site or mail them to Valley Water prior to January 27, 2020, the end of the Draft Environmental Impact Report review period.

Mail: Michael Martin
Valley Water
5750 Almaden Expressway
San Jose, Ca. 95118-3686

Additional information on the report is available at the project website at:
https://www.valleywater.org/project-updates/almaden-lake-improvement-project

Please share your comments below.

The Draft Environmental Impact Report assesses potential environmental impacts resulting from construction and operation of the project, and suggests ways to minimize significant impacts.

1) New channel of Alamitos Creek near the Boat House: City of San Jose has an existing 42" CMP storm drain outfall pipe (labeled as #435) and concrete riprap structure. located nearby - draining into the current, existing lake. Q: will the Project affect this City asset? If yes - what will be done to structure which is collapsing around the CMP.

1

From: howard demroff <howardpaul2@sbcglobal.net>
Sent: Tuesday, January 7, 2020 7:21 AM
To: Michael Martin
Subject: Almaden Lake

Hello Michael,

What will be the total cost for this project? What will be the annual cost for the imported water to maintain the lake? 1

Thank you,
Howard

Sent from Yahoo Mail for iPad

Comment Card

ALMADEN LAKE IMPROVEMENT PROJECT

Public Meeting, January 8, 2020

Valley Water

Please provide your contact information below

Name Howard Demroff

Phone

Email howardpaul2@sbcglobal.net

Address

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Mail: Michael Martin
Valley Water
5750 Almaden Expressway
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Please share your comments below.

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I am concerned about the cost. The cost per trout is thousands of dollars per fish. The lake will need 50 gallons per second. That will be more than all the residents of Almaden Valley for the day. The Methy Mercury is decreasing without this major project.

1

From:	Brenda Dohmen
To:	Michael Martin
Subject:	Almaden Lake Improvement Project Draft Environmental Impact Report Request for Comments
Date:	Sunday, January 26, 2020 5:59:36 PM

Michael,

Here are my EIR Comments as requested by Jim Kuhl:

1. ***Should redesign Almaden Lake contain two fauna habitat islands or one?*** *One, less is more.* 1
2. ***Should swimming capability be established in redesigned Almaden Lake by becoming a future City Parks Department project goal?*** *No, too much work, cost, responsibility and liability for the city.* 2

Brenda Dohmen
Almaden resident

Comment Card

ALMADEN LAKE IMPROVEMENT PROJECT

Public Meeting, January 8, 2020

Valley Water

Please provide your contact information below

Name STEPHEN FERREE

Phone 408-997-7975

Email sr_ferree@yahoo.com

Address 6652 Charter Oak Pl.
SJ 95120

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Mail: Michael Martin
Valley Water
5750 Almaden Expressway
San Jose, Ca. 95118-3686

Please share your comments below.

The Draft Environmental Impact Report assesses potential environmental impacts resulting from construction and operation of the project, and suggests ways to minimize significant impacts.

Excellent presentation The district has obviously listened to the residents over the years and current plan looks great.

1

From: J. B. <jefboyer@hotmail.com>
Sent: Saturday, January 4, 2020 4:21 PM
To: Michael Martin; Tony Mercado
Subject: January 8th Almaden Lake program

The Open Space organizations have done a great job of educating the public on the Coyote Valley Landscape Linkage and Watershed,
https://www.openspaceauthority.org/system/documents/Coyote%20Valley%20Landscape%20Linkage%20Report_Final_lowres.pdf

Please address how the restoration of water flow through the Almaden Lake Park will tie into Coyote Valley Watershed's health. 1
That will help to continue to educate the public on the BIG picture, not just their 'backyards'.

Thanks.

From: J. B. <jefboyer@hotmail.com>
Sent: Thursday, January 9, 2020 7:21 PM
To: Kirsten Struve; Rechelle Blank
Subject: The chemistry of Almaden Lake

Dear Kirsten (and Rechelle),

Husband Steve and I appreciated last night's Almaden Lake EIR forum at Valley Water headquarters. The presence of SJ city govt rounded out the perspective well in responding to community member's inquiries.

Steve and I are both chemists - a perspective that was not covered (nor expected to be) in last night's program. We were directed to contact you.

Please point us to reports on the chemistry aspects of the Almaden Lake Improvement Project, for example
- past, current, and future status of monitoring and treatment of the various mercury salts
- Microbe or other reagent treatment of methylmercury
-The nature of the material layer to be applied to the emptied lake bottom before refilling with water. 2

Let us know if we can be of help in discussions/decisions. We both have Ph.D.s and decades of experience in chemistry.

Sincerely,
Jane Frommer and Steve Boyer
p.s. hope you've seen "Remediation Strategies for Mercury Contaminated Lakes and Reservoirs Within the State of California" - a 2017 USF Masters thesis by Emily Chortek, on-line. 3

From: Edward Klaus <edkvalk2@gmail.com>
Sent: Tuesday, January 7, 2020 1:37 PM
To: Michael Martin
Subject: Almaden Lake Improvement Project

It seems the world has scheduled Wed. Jan 8 for their first session of the year. A long way of saying that I will be absent, but
I have a concern. It would think that providing a controlled inlet from the creek and using the pump now planned to remove water from the lake would be better than getting water from another source at what expense and whose authority. 1

In discussing the park I see no mention of what amenities will added/retained/removed/etc. While this may fall under another
departments control I think we should know what will happen in that regard. 2

I hope that you have a good productive meeting. This will be an interesting project to observe.

Ed Klaus
Almaden resident .

Comment Card

ALMADEN LAKE IMPROVEMENT PROJECT

Public Meeting, January 8, 2020

Valley Water

Please provide your contact information below

Name Greg Koopman

Phone

Email gtkoop@pacbell.net

Address 537 Yurok Cir
SJ. CA 95123

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Mail: Michael Martin
Valley Water
5750 Almaden Expressway
San Jose, Ca. 95118-3686

ValleyWater.org Clean Water • Healthy Environment • Flood Protection

Please share your comments below.

The Draft Environmental Impact Report assesses potential environmental impacts resulting from construction and operation of the project, and suggests ways to minimize significant impacts.

Do we need a big wall to block Almaden Expw. so the noise level will not affect the birds.
Thx.

1

From:	Jim Kuhl
To:	Michael Martin
Subject:	FW: Almaden Lake Improvement Project Draft EIR Formal "Comment" Regarding Lake Water Pump Noise Goal
Date:	Sunday, January 26, 2020 11:00:19 AM

Michael,
Thank you for speaking at the 1/11/20 D10LC General meeting on the "Almaden Lake Improvement Project." In the email trail below is a "Comment" on the project's draft ERI "Comment" sent to Sunshine Julian. I understand you are the official EIR "Comment" focal point for the Valley Water project team.
Jim Kuhl
(408) 398-5583

From: Jim Kuhl <jim.kuhl@comcast.net>
Sent: Sunday, January 26, 2020 10:26 AM
To: Sunshine Ventura Julian <svjulian@valleywater.org>
Subject: Almaden Lake Improvement Project Draft EIR Formal "Comment" Regarding Lake Water Pump Noise Goal

Sunshine,

At the onset, I apologize for this long "Comment" input but a through explanation with reasoning was warranted on the project's Lake pump's noise performance goal due to the complexity and nuances associated with the topic.

So we have a common basis for discussing noise, below are a few ambient noise level references I gathered.

> Levels of highway traffic noise typically range from 70 to 80 dB(A) at a distance of 15 meters (50 feet) from the highway. These levels affect a majority of people, interrupting concentration, increasing heart rates, or limiting the ability to carry on a conversation. While 70 decibels is acceptable for simple or mainly transactional office work, 55 decibels is the requirement for what one terms "mainly intellectual work." The normal noise range for modern fridge freezers is 32 to 47 dB. Anything quieter than 40 dB is considered a quiet model, as this is the typical noise level of a library. To the human ear, a 10 dB increase in a sound means that it is 2X as loud. *Note: Prior information provided without referencing.*

To add to this discourse on noise, back in 2014 I reviewed and "Commented" on Guadalupe Landfill's ERI for their proposed "Gas Recovery Facility." The facility was to be located on a ridge line overlooking Almaden Quicksilver Park's McAbee entrance area's trails. Noise generated by the proposed facility was a major concern, among other issues. The following key points surfaced as I researched the noise topic for this EIR:

1. The = 55 dB noise level is intended to apply in an urban city center and levels that exist near a freeway. In my opinion, one must be cautious in using 55 dB as an acceptable goal in Almaden Lake Park because of its natural setting. However, this is what the San Jose City

1

code specifies and allows.

2. The City's General Plan or Code "Noise" abatement requirements are based on the *average sound energy levels over a 12- hour period that is called the* ***ambient noise level***.
3. The City of San Jose's General Plan identifies a 5 dB increase in *ambient noise* as being significant and requires an EIR.
4. The City's noise abatement ordnance makes no recognition of sound tonal characteristic differences (i.e. an egret bird call, the rustle of leaves in the wind, the flow of water over rocks, the roar of a Harley Davidson motorcycle or the hum of a water pump).
5. The City's noise abatement code makes no recognition of more stringent goals one might seek to have so as to not degrade a natural park setting.
6. For the proposed Guadalupe Landfill "Gas Recycling Facility," at the property line shared between the Almaden Quicksilver Park and Guadalupe Landfill's parcel, the measured ambient sound was 39:42 dB over a 24-hour period. However, the ambient noise significantly varied by time and day of the week. The ambient noise was ~40 dB during rush commute hours in Almaden Valley and went down to ~28 dB between midnight and 4:00 am on weekends. It surprised me how high the average noise level remained at midnight even on a Sunday. I went out to the site once at midnight to get a sense of what the low ambient noise level was like. **I could very distinctly hear a Harley Motorcycle miles away going up Almaden Expressway and a jet plane flying 35,000 feet above me but I also heard the hoot of owls and the rustle of leaves in the wind in the quite periods in the hour I spent at the site. It is these quite periods we should want to preserve, if possible in the Park.**

1 cont.

2

You indicated 71 dB as the noise level on Coleman for what I assume was the average ambient noise measured over a 24-hour period. A 72 dB noise level is similar to standing next to a gas powered lawn mower continuously operating for 24 hours. This 72 dB average nose energy measurement does not define the peak or low noise levels or their duration nor the noise tonal characteristics. As a point of reference, = 57 dB was Port of Los Angeles proposed 4-lane suspension bridge "noise" level requirement in 2014. In my opinion, using this Coleman road noise as the ambient noise level reference point for the EIR has no value unless the water pump is going to be located at a location next to the road near where the ambient noise measurement was made.

3

Proposed Pump Noise Performance Requirements:

To practically resolve the Lake water pump noise in a manner recognizing the Park's natural theme yet not creating overly burdensome and costly noise abatement goals, I recommend the following approach:

1. Identify the precise planned pump location and make ambient noise measurements prior to site preparation and pump installation.
    a. Try to locate the pump installation site in a *noisy* location within the Park, perhaps close to Coleman Road.
    b. Isolated low noise locations should be avoided, if possible.
    c. Using the Park's property lines as the location to measure and/or monitor the pump generated ambient noise makes no sense given all the trails within the Park plus people walk all over in the grassy areas. A point 50 feet away from the pump site appears to be a reasonable compromise to be used as a pseudo relevant property line.

4

2. Measure the ambient noise level 24/7 at that selected site location.
    a. Identify the ambient noise measured by hour for each separate hour on a 24 hour clock over the 7 day period. However, different from the code requirement and recognizing the Park natural theme, show the noise measurements results on a 24 hour 7 day graph or log the information for 7 days for each hour over 24 hours in a (7x24) matrix data table.
    b. Be sure the 7 day period selected to make ambient noise measurements is truly "normal" (e.g. not measured when project's construction is underway or during a big Park event or during a storm).
    c. **Design the pump facility to operate at a maximum of 5 dB over the lowest measured level at the site for the period it will be operational.** If possible, the pump should only operate during existing *noisy* Park daytime periods excluding emergencies (e.g. flood control situation).

5

3. **For the pump's planned operational times, after it is installed, the pump facility's external noise generation must be no more than 5 dB higher than the *lowest* ambient noise level measured during the same time at the site prior to pump installation as measured 50 feet away from the pump's installation site.**
    a. The pump's enclosure can be above or below ground as long as it satisfies the noise abatement goal and blends into the surroundings around it. If the pump is installed in a Park location area not normally illuminated at night, it should not have automatic night lighting.

6

I hope this "Comment" has value to the project implementation team. Please forward this input to the appropriate individual(s) within Valley Water.

Jim Kuhl
(408) 398-5583

PS: For reference, your "Comment" that initiated my "Comment" is below:

> "Jim: A pump station is needed to move water from the new redesigned lake to downstream percolation ponds. The pump may be constructed above ground or underground. The draft EIR states that: The District and/or its construction contractors shall be required to fully enclose the pumps at the proposed pump station, to reduce operational noise levels. The enclosure shall fully cover all pumps, and shall be sufficient to reduce noise levels to 55 dB or lower at each residence within 500 feet of the Project site. For perspective, the 55 dB is considered equivalent to the sound produced by a household refrigerator. Noise adjacent to Almaden Expressway was measured at 71dB."

From: Jim Kuhl
To: Michael Martin
Cc: Sunshine Ventura Julian
Subject: Almaden Lake Improvement Project Draft EIR "Comments"
Date: Sunday, January 26, 2020 3:21:57 PM

Michael,

I understand you are Valley Water's focal point for gathering the draft EIR "Comments" on the "Almaden Lake Improvement Project." Below are five "Comments."

1. **Two habitat islands Lake project design proposal – Recommend, a one island lake design.**

While highly judgmental and arguable, I have personally concluded that there should only be one habitat island, rather than two. 1

The redesigned lake with the dedicated Los Alamitos Creek channel proposal **shrinks the existing lake approximately 30% radically diminishing the existing lake's size and significantly reduces Almaden Lake's aesthetic appeal to the community**. For aesthetic reasons, we need to try to make the redesigned Lake appear larger, wherever possible, not smaller. Adding the second island only makes the redesigned lake look even more small in return for the indeterminant value of growing the fauna population over time through increased protected island habitat. Doubling the fauna habitat with two islands could promote doubling the waterfowl population during their layovers on an annual basis. Doubling the waterfowl population would also tend to foul the Lake's water from their droppings twice as fast. This deteriorated lake water quality would then generate the need to increase Delta water flow through the lake to cleanse it which is wasteful of scarce water resources. 2 3

2. **Project's impact on Almaden Lake north of Coleman Road not shown nor discussed in the draft EIR presentation.**

The draft EIR presentation did not indicate what the project's impact will be on the north side Coleman Road relative to the lake's size. 4

Today, Almaden Lake continues under the Coleman Bridge north, increasing the overall lake's perceived size by about 25%. After project implementation, it is my assumption that this area north of Coleman Road will be totally dry, even during the wet season due to continuation of the new Los Alamitos Creek channel to where it merges with Guadalupe Creek forming Guadalupe River. 5

3. **Who will restocking Alamitos Creek with native fish (e.g. Steel Heard Trout) after an extended drought?** 6

Although native fish restocking is not an "Almaden Lake Improvement Project" goal, will Los Alamitos Creek restocking take place when necessary and performed by whom?

During the recent 4 year drought at its peak, I can vividly remember walking up Los Alamitos's Creek 7

bed between Almaden Lake and Harry Road and the creek bed was bone dry except for a few stagnate puddles of water. A massive native fish fingerlings die-off must have occurred during the drought. Periodic restocking programs appear to be needed to restore native fish in the creek's ecosystem after severe droughts when water flow from reservoirs and the delta is rigorously rationed and severely constrained. 7 cont.

4. **Identify project's desired "Water Temperature Goals" in the redesigned lake and in Los Alamitos Creek's new channel and management system.**

The water temperature levels deem as being too high thus dangerous for native fish survival or at unacceptable high levels stimulating methylmercury generation were not identified in the draft ERI presentation. Obviously, managing the water temperature requires cold water inflow and warm water outflow from Los Alamitos Creek's new channel and through the redesigned Lake down to the dam adjacent to Los Alamitos Percolation Ponds across Guadalupe River. The water temperature monitoring and water flow control management systems required to keep the creek's and lake's temperature below harmful levels was not described. 8

Given an extended drought and the need to severely ration water releases from reservoirs, the project's limitations, if any, in achieving desired temperature goals within the project's purview were not described. 9

5. **Plan to manage mercury laden sediment that collects at the front base of the Los Alamitos Drop Structure adjacent to the Los Alamitos Percolation Ponds was not described.**

The draft ERI presentation identified that mercury laden silt during natural storms will continue to be carried down Los Alamitos Creek and will be deposited in front of the Los Alamitos Drop Structure (i.e. dam) rather than within redesigned Almaden Lake. No process was described on how this potentially toxic sediment was going to be managed to prevent it from becoming an environmental problem in the ecosystem on an ongoing basis. 10

If you need any clarification, or have issues/concerns with these "Comments," please call me.

Jim Kuhl
(408) 398-5583

From: jenny@tyger.org
Sent: Saturday, January 4, 2020 4:48 PM
To: Michael Martin
Subject: Almaden lake project

This project is not an improvement. This lake is a beautiful park of our community and your plan is to destroy that. I do hope you reconsider. 1

Jennifer Lang

Sent from my iPhone

From: John Miller <jdmiller1023@gmail.com>
Sent: Monday, January 6, 2020 4:15 PM
To: Michael Martin
Subject: Almaden Lake

I have asked this question before and I will do so again. Why do we feel the need to change what is (or has become) a landmark attraction for families throughout the Almaden Valley and South Santa Clara Valley? It appears from you web content that the primary goal is to protect the steelhead population, theoretically allowing them to navigate upstream more readily. However, I have lived here in Almaden for decades and know that the Alamitos Creek is very drought sensitive and has been essentially dry on many occasions over the last 20 years. Such susceptibility would inherently jeopardize any viable steelhead population. 1

The mercury levels in the lake bottom may be an issue, but hardly a negative risk factor for the local, lake/park visitor population. And there are way to reduce the mercury level if that was the primary intended goal. 2

Additionally, the proposed design effectively cuts the park access to the lake by more than half, eliminating a very popular family and event lakeside setting. Not really in the best interest of the local citizens. 3

Looking at the marketing language in your website, and comparing that to what I hear from my Almaden neighbors, I wonder what portion of the local citizens (taxpayers) is actually for this change. You state that options 6 & 7 "received the most support", but fail to state how many citizens simply opposed the idea. My sense is that given the simple question "do you want us to mess with this lake or not?" the majority would favor leaving it alone. 4

All this said, and in consideration of your time an attention, I will cut to the chase. I oppose this grandiose plan to rob the community of this cherished natural attraction. Though enrobed in the language of protecting the steelhead it smacks of empire building to me and lacks a compelling need to make these changes. 5

My sense is that Valley Water would be better able to serve the rate-paying citizens of Almaden in particular and the South Santa Clara Valley in general by focusing your attention on fending off the next (coming) drought and valley-wide water shortage and not looking for pet projects to foist upon Almaden Valley residents. 6

Respectfully;
John Miller.

Comment Card

ALMADEN LAKE IMPROVEMENT PROJECT

Public Meeting, January 8, 2020

Valley Water

Please provide your contact information below

Name Edna Padilla

Phone 408-659-5478

Email edna.padilla59@gmail.com

Address 38 Kent ct San Jose, CA 95139

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Mail: Michael Martin
Valley Water
5750 Almaden Expressway
San Jose, Ca. 95118-3686

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Please share your comments below.

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- Where would the water be coming from to provide the new water source to the lake? 1
- The water being drain, where would it go? 2
- How can the Valley Water help minimize the risk of Air Quality during construction besides watering the debris? 3
- Will the Valley Water send out notices about the noise? How can one be update about the project from start to finish. 4

Comment Card

ALMADEN LAKE IMPROVEMENT PROJECT

Public Meeting, January 8, 2020

Valley Water

Please provide your contact information below

Name STEVEN PAGAN

Phone 408 629 2255

Email thepagans@sbcglobal.net

Address 926 Hampswood Wy SJ CA 95120

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WHAT IS THE PLAN TO MAINTAIN TWO ANNUAL COMMUNITY EVENTS AT ALMADEN LAKE PARK, IE. ART & WINE FESTIVAL IN SEPTEMBER AND JULY 4TH FIREWORKS EVENT? WILL THESE BE MAINTAINED? ~~ARE THESE INCLUDED IN~~

1

I-023-Roldan

From:	Marie Roldan
To:	Michael Martin
Subject:	Alamaden Lake Improvement Project
Date:	Wednesday, January 22, 2020 9:48:44 AM

Since I was unable to attend the meeting, I would like to submit my comments regarding the project.
I heartily support the Improvement Project as proposed. It will be both environmentally and ecosystemically sound. It will also add to the beauty of the surrounding areas....an addition we can use to help decrease the industrialize appearance of the area. 1 2

My one concern, however, is the imported water source that will be used. Where will it come from? Will it come from an area needs it..another lake or pond....where it is need for agricultural? 3

As one committed to project preserving the environment and climate, I look forward to the completion of the Improvement Project.
Good luck and thank you.

Sister Marie Gertrude Roldan, CSJ

Comment Card

ALMADEN LAKE IMPROVEMENT PROJECT

Public Meeting, January 8, 2020

Valley Water

Please provide your contact information below

Name Gavin Romero

Phone [redacted] 650-623-7227

Email pawmwall@gmail.com

Address 5751 Halleck Dr

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Please share your comments below.

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I was wondering if there will be a change in the fishing rules once the construction is over with. 1

I was also wondering if any new fish will be planted in the lake after construction 2

Comment Card

ALMADEN LAKE IMPROVEMENT PROJECT

Public Meeting, January 8, 2020

Valley Water

Please provide your contact information below

Name Tristan Romero

Phone 650-676-5137

Email Tristanromeros2016@gmail.com

Address 5751 Hallerk Dr

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Please share your comments below.

The Draft Environmental Impact Report assesses potential environmental impacts resulting from construction and operation of the project, and suggests ways to minimize significant impacts.

How will this project effect fishing in both the creek and lake itself? Also will floatubes and kayaks be allowed to fish once water is cleaner?

1

2

From: Michelle Doerner <michelledoerner@gmail.com>
Sent: Saturday, December 28, 2019 9:35 AM
To: Michael Martin
Subject: Almaden Lake Improvements

Dear Michael,
As a resident that is 5 minutes from the lake, I am strongly in favor in restoring the lake water to be usable for children to wade in as it once was during my youth. 1
I also strongly support creating a levee to help the animal populations thrive in the creeks. 2

It is about time the city worked to create a better space for our community. I imagine such a wonderful beach on hot days for wading and swimming.

Thank you,
Michelle Smith

Sent from my iPhone

From: Susan Tran <sujahn04@yahoo.com>
Sent: Monday, January 6, 2020 10:17 AM
To: Michael Martin
Subject: Almaden Lake Reduction

Hi Michael,

I read about the Almaden Lake Reduction on Next Door and wanted to comment.

My strong preference is that the lake size is not reduced. Are there alternatives that would route the creek around it without reducing the lake size? It's so beautiful and seems a shame to lose it, though I understand the problems concerning the migrating fish and lake pollution. 1 2

If you must reduce it, please leave trails around the park (with a bridge over the creek) that equal approximately a 2 mile walk/bike ride. The city completed the foot bridge so that people could walk/bike around the lake and I would like to see that still possible. 3

Thank you and your committee for the work you've put into this project.

Truly,
Susan Tran

Comment Card

ALMADEN LAKE IMPROVEMENT PROJECT

Public Meeting, January 8, 2020

Valley Water

Please provide your contact information below

Name Bernadette Troyan
Phone (408) 927-7856
Email bernadette.troyan@gmail.com
Address 1715 La Terrace Circle
San Jose, CA. 95123

Attendees may fill out comment cards and leave them at the meeting site or mail them to Valley Water prior to January 27, 2020, the end of the Draft Environmental Impact Report review period.

Mail: Michael Martin
Valley Water
5750 Almaden Expressway
San Jose, Ca. 95118-3686

Additional information on the report is available at the project website at:
https://www.valleywater.org/project-updates/almaden-lake-improvement-project

ValleyWater.org Clean Water • Healthy Environment • Flood Protection

Please share your comments below. ~~Will neighbors ac~~

The Draft Environmental Impact Report assesses potential environmental impacts resulting from construction and operation of the project, and suggests ways to minimize significant impacts.

I live across the street and we have a pond system. - Should we expect All the lake birds to relocate to our premises? Where will they go? How can the problem of the Geese just be transferred? 1

Living across the street, the pump noise situation ~~frightens~~ concerns me. (Insomniac) - Can the pumps not run at night? 2

From: Jeff Watt <jrwatt007@gmail.com>
Sent: Wednesday, January 8, 2020 1:25 PM
To: Michael Martin
Subject: Re: Draft Environmental Statement for Lake Almaden

Thank you. Have you considered removing the mercury using something like the Chalmer's device described here? Seems like the key issue is HG not fishing. Wouldn't a 1a option, capping the lake, more bees, and ultimately removing some of the mercury be an alternative that should at least be considered? 1 2

Jeff Watt

https://photos.app.goo.gl/S7LNeRdzF3hf8Xz88

On Wed, Jan 8, 2020 at 8:57 AM Michael Martin <MichaelMartin@valleywater.org> wrote:

> Mr. Watt,
>
> The Draft EIR can be reviewed or downloaded on Valley Water's website
>
> https://www.valleywater.org/project-updates/public-review-documents
>
> There are also hard copies available for review at Valley Water Headquarters and at the reference desk of local libraries (Almaden, Vineland, Pearl, Edenvale, Cambrian, and Santa Teresa branches).
>
> **MICHAEL MARTIN**
> ASSOCIATE WATER RESOURCES SPECIALIST
>
> Water Supply Planning and Conservation
>
> Tel. (408) 630-3095
>
> Santa Clara Valley Water District is now known as:
>
> 
>

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www.valleywater.org

From: Tony Mercado
Sent: Tuesday, January 7, 2020 5:17 PM
To: Rechelle Blank <rblank@valleywater.org>; Michael Martin <MichaelMartin@valleywater.org>
Subject: FW: Draft Environmental Statement for Lake Almaden

FYI.

TONY MERCADO
PUBLIC INFORMATION REPRESENTATIVE II

Office of External Affairs

Tel. (408) 630-2342 / Cell. (408) 426-1039

Santa Clara Valley Water District is now known as:



Clean Water • Healthy Environment • Flood Protection

5750 Almaden Expressway, San Jose CA 95118
www.valleywater.org

From: Jeff Watt <jrwatt007@gmail.com>
Sent: Tuesday, January 7, 2020 4:58 PM
To: Tony Mercado <tmercado@valleywater.org>
Subject: Draft Environmental Statement for Lake Almaden

Can you provide a copy of the draft report so we can be prepared for the meeting tomorrow?

Jeff Watt

1013 La Terrace Cir, San Jose, CA 95123

Michele King

From: Jeff Watt <jrwatt007@gmail.com>
Sent: Friday, January 10, 2020 9:00 AM
To: Board of Directors
Subject: Rethink Lake Almaden Project
Attachments: Remediation Strategies for Mercury Contaminated Lakes and Reservoirs Within the State of California.pdf

Dear Board Members,

My wife and I moved here from Seattle 6 years ago to be near our grandchildren. We spend many hours walking and playing with them by Lake Almaden near our condo. We went to several meetings on the project but it was clear to us that the District was stuck on the idea of separating the lake from the creek. We were especially interested in reading the EIS report because I knew as a mechanical engineer that any environmental review would have to at least consider alternatives that would have less impact on the environment. We were upset the report didn't include any alternatives to creek separation. 1

My call to action was also generated by my disappointment in my profession over the failures of engineers to speak up when they felt something was wrong--especially those at Boeing for whom I worked a a vendor for many years. Most of the engineers at Valley Water are civil engineers. Their "tools" are concrete and earth moving equipment so I am not surprised that one solution they would consider would be a big civil engineering project. What I didn't expect is that they would not look seriously at any alternatives--even after the very small scale "bees" were very successful in reducing the methyl mercury in the lake. 2 3

I am attaching a paper by Emily Chortek completed in 2017 for her masters project at the University of San Francisco titled, " Remediation Strategies for Mercury Contaminated Lakes and Reservoirs in the State of California." This paper lists pros and cons of various mediation strategies and does not mention an option for separation of the lake from the supplying creek.

I am also attaching a link to a recent conference on dealing with Mercury contamination just to give you and idea of the broad scope of possible alternate solutions to the massive construction proposed by the District: https://www.dartmouth.edu/press-releases/international_mercury_conference.html

I realize a lot of money has already been spent on this project. But failing to speak up when you know something is wrong leads to bad outcomes. Please reconsider the massive construction project proposed by the District. We likely have better solutions available at much lower cost to the environment. 4

Jeff Watt
1013 La Terrace Cir, San Jose CA 95123

425 614 5926
jrwatt007@gmail.com

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Winter 12-15-2017

Remediation Strategies for Mercury Contaminated Lakes and Reservoirs Within the State of California

Emily Chortek
echortek53@yahoo.com

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Recommended Citation
Chortek, Emily, "Remediation Strategies for Mercury Contaminated Lakes and Reservoirs Within the State of California" (2017). *Master's Projects and Capstones*. 691.
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This Master's Project

REMEDIATION STRATEGIES FOR MERCURY CONTAMINATED LAKES AND RESERVOIRS WITHIN THE STATE OF CALIFORNIA

by

Emily Chortek

is submitted in partial fulfillment of the requirements for the degree of:

Master of Science

In

Environmental Management

at the

University of San Francisco

Submitted:

December 14, 2017

Submitted:		Received:	
……		……	
Emily Chortek	Date	Gretchen Coffman, Ph. D.	Date

Table of Contents

List of Tables ..... **iv**

List of Figures ..... **v**

List of Acronyms and Abbreviations ..... **vi**

Abstract ..... **vii**

Introduction **1**
Sources of Mercury 1
Historic Mercury Pollution from Gold Mining Practices in California 1
Mercury Speciation 2
Mercury Cycling in Freshwater Systems 3
Why is Methylmercury an Environmental and Public Health Concern? 5

Research Objectives: **6**

Methods **7**

In Situ Aeration and Oxygenation **7**
Lake Stratification 7
Oxygen Availability in Lakes and Reservoirs 9
What is Hypolimnetic Oxygenation? 10
How Does Hypolimnetic Oxygenation Inhibit Methylmercury Production? 10
Hypolimnetic Oxygenation Devices and Systems 11
Biological and Chemical Benefits of Maintaining an Aerobic Hypolimnion 13
Benefits of Implementing Hypolimnetic Oxygenation 14
Challenges of Implementing Hypolimnetic Oxygenation 15

In Situ Aqueous Capping **16**
Benefits of Implementing In-Situ Aqueous Capping 17
Challenges to Implementing In-Situ Aqueous Capping 18

In Situ Dredging **19**
Benefits Associated with In Situ Dredging 20
Challenges Associated with In Situ Dredging 21

Phytoremediation **23**
Benefits of Implementing Phytoremediation 23
Challenges of Implementing Phytoremediation 25

Chemical Additions **26**
Environmentally Relevant Reducing-Oxidizing (Redox) Conditions 26
Nitrate Addition as a Remediation Strategy 28
Benefits of Implementing Nitrate Addition 29
Challenges of Implementing Nitrate Addition 30

Comparative Analysis of Remediation Methods **31**

Recommendations 39
Implement Hypolimnetic Oxygenation for Effective Mercury Control 39
Statewide Ranking of Contaminated Lakes 40
Monitor Mercury Concentrations at Lower Trophic Levels 41
Reduce Atmospheric Mercury Emissions 41
Consumption of Fish Species Lower on the Food Chain 44

Literature Cited 47

List of Tables

Table 1. Mercury species found in the environment..... 2

Table 2. Chemical compounds that are amenable to phytoremediation 24

Table 3. Summary of Comparative Analysis of Remediation Methods 32

Table 4. Summary Table of Advanced Air Pollution Control Devices 44

List of Figures

Figure 1. Mercury cycle in aquatic systems..... 4
Figure 2. Stratification of lake aones 8
Figure 3. Biological stratification of lake layers..... 9
Figure 4. Simplified image of an airlift aerator 11
Figure 5. Drawing of conceptual speece cone 12
Figure 6. Bubble plume diffusers, linear (left) and circular (right) 13
Figure 7. Drawing of in situ aqueous cap……. 16
Figure 8. Hydraulic dredging (top), mechanical dredging (bottom)……. 19
Figure 9. Sequence of important environmental oxidants through aerobic and anaerobic pathways 25
Figure 10. Fish consumption advisories and Safe Eating navigation tool..... 45
Figure 11. Approximate serving size of fish for children and adults……46

List of Acronyms and Abbreviations

$Ca(NO_3)_2$	Calcium Nitrate
CH_3^-	Methyl Group
CH_3Hg^+	Methylmercury
CH_4	Methane
CO_2	Carbon Dioxide
DO	Dissolved Oxygen
EPA	Environmental Protection Agency
Fe^{2+}	Ferrous Iron
Fe^{3+}	Ferric Iron
H_2S	Hydrogen Sulfide
Hg^0	Elemental Mercury
Hg^{2+}	Ionic Mercury
HgT	Total Mercury
HOS	Hypolimnetic Oxygenation
HS^-	Hydrogen Sulfide
MATS	Mercury and Air Toxics Standards
MeHg	Methylmercury
Mg/L	Milligram per liter
Mn^{2+}	Manganese
N_2	Nitrogen
NO_3^-	Nitrate
OH^-	Hydroxide
PPM	Parts per million
RCRA	Resource Conservation and Recovery Act
Redox	Reducing-Oxidizing
S^{2-}	Sulfide
SO_4^{2-}	Sulfate
SRB	Sulfate reducing bacteria
ug/g	Micrograms per gram

Abstract

Mercury is an environmental and public health concern due to its neurodegenerative effects and ubiquitous concentration within the environment. To mitigate these risks and reduce concentrations within the environment, remediation methods are necessary. The purpose of this paper is to investigate and evaluate the efficacy of a number of remediation options for mercury contaminated lakes and reservoirs in the State of California. This paper also identifies a number of challenges associated with the implementation of each method and provides recommendations for environmental managers to use when remediating mercury contaminated lakes. Hypolimnetic oxygenation (HOS) was found to be the least problematic remediation method and nitrate additions were found to be the most problematic. Remediation through dredging is only ideal for severely polluted sediments and can be cost prohibitive for many environmental managers. Phytoremediation is not an ideal method either due to lack of non-invasive mercury accumulating plants. Aqueous capping is a viable method, but only if the lake or reservoir is small in size. HOS is the least problematic remediation method investigated in this paper. HOS controls and prevents mercury from being methylated and entering the food web with the added benefit of increasing oxygen levels and cooling benthic temperatures. In order to decrease mercury deposition and mercury concentrations within California lakes, it is recommended that State and Federal legislation be passed to set mercury emission standards to reduce atmospheric deposition and emissions from coal fired power plants. In conjunction with legislative action, it is also recommended that both old and new coal fired power plants be fitted with advanced pollution control technologies to decrease mercury emissions in the United States. There is also the need to prioritize lakes for remediation efforts across the state due to limited environmental funding. Furthermore, it is also recommended to reduce risk of exposure in humans to eat fish lower on the food chain, or to eradicate animal proteins from their diet entirely.

Introduction

Mercury is a global pollutant and a neurotoxin that is both an environmental and public health concern. Increases in anthropogenic activity since the Industrial Revolution have increased the amount of mercury in the environment three-fold (Lamborg et al., 2014). Fossil fuel combustion, gold mining activities, and precious metal processing have released tremendous amounts of this element into the environment. Due to these activities in the State of California, exposures to mercury has increased in both wildlife and humans, causing neurodegenerative effects. In order to mitigate this issue, this research project posits a number of remediation techniques that may be able to alleviate the mercury pollution found in these freshwater lakes and reservoirs in the State of California.

Sources of Mercury

Mercury has both natural and anthropogenic sources. Natural sources of mercury exist in the Earth's crust, volcanic eruptions, forest fires and emissions from the ocean (US EPA 2017). Global mercury emissions from both natural and anthropogenic sources are estimated to be between 2000 and 8000 metric tons annually, with the majority coming from anthropogenic sources (US EPA 2017) (USGS 2017). However, a disproportionate amount of anthropogenic activity contributes to global mercury emissions. The majority of these anthropogenic activities come from indirect sources. This includes: atmospheric emissions, surface deposition from industrial activities, like fossil fuel combustion, production of metals or coal burning for energy consumption (Michael et al. 2016) (US EPA 2017). Direct discharge of inorganic mercury also can come from mining practices, like chlor-alkali plants, or artisanal small-scale gold mining activities (ASGM) (Matthews et al. 2013).

Historic Mercury Pollution from Gold Mining Practices in California

Mining for precious metals, like gold, has contributed significantly to mercury pollution within California. While precious metal mining has generally ceased within the State, their effects upon the environment still remain. California is known for its' rich history of gold mining, which has

led to one of the largest sources of direct mercury contamination to aquatic resources in California. Historically, mercury was used to increase the recovery of gold extraction. Miners would search for placer deposits, which are called alluvial or swath deposits, that are unconsolidated gravel that contains gold (Alpers et al. 2005). In order to extract the gold from these deposits, miners would spray water from high pressure hoses to break up these rock deposits into smaller pieces. Then, the slurry was funneled into a sluice where water and gravel would flow over the top of the screen, and gold pieces would fall through and be collected at the bottom. This extracted large pieces of gold, but was unsuccessful at collecting finer gold flakes. In order to increase gold recovery, hundreds of pounds of liquid mercury were added to the sluice and the mercury would bind to the gold, forming an amalgam. This solid was then collected and heated so the mercury would turn into vapor, leaving the solid gold behind (Gibb et al. 2014).

Unfortunately, this practice was extremely inefficient and mercury leached out into nearby soils, bedrock streams and mine tailings. Approximately 220 million pounds of mercury was produced in California from 1850 to 1981. From this total amount, mercury loss to the environment from hydraulic mining is estimated to be 10 million pounds (Alpers et al. 2005). On average, annual gold mining practices would lose approximately 25 percent of the mercury input into the system (Alpers et al. 2005). Today, hundreds of millions of pounds of mercury are still unaccounted for, and persist within aquatic systems throughout California.

Mercury Speciation

Mercury has many different species that partition into various areas of an ecosystem. (Table 1).

Table 1. Mercury species found in the environment (Lamborg et al. 2014)

Species	Chemical Formula	Note
HgT	HgT	Total Mercury
Hg^0	Hg(0)	Elemental Mercury
Hg^{2+}	Hg(II)	Ionic Mercury
CH_3Hg^+	$MeHg^+$	Methylmercury
CH_3^-	CH_3^-	Methyl Group

Each mercury species is considered an environmental pollutant, with organic mercury arguably the most damaging to the environment and biota. Total mercury, or HgT is commonly used to describe all mercury species within a system. Hg^0 is another species commonly known as elemental mercury (Center for Disease Control 2016). Elemental mercury exists as a liquid metal at room temperature. Elemental mercury can be found in dental amalgams, lightbulbs, and old thermometers (Fitzgerald and Lamborg 2007; Matthews et al. 2013). In the environment, elemental mercury exists in a gaseous form, where it has a long residence time, and globally transported (Fitzgerald and Lamborg 2007). Chronic, low-dose inhalation exposure can cause neurological damage, memory problems, and in high concentrations damage human lungs (CDC 2016).

Hg^{2+} is another form of mercury, commonly called ionic mercury. This is an inorganic form and is the most common species found in the environment (Lamborg et al. 2014). Often it complexes to other ions, forming a compound, like mercury chloride or mercury sulfide (Selin 2009) (Center for Disease Control 2016). These compounds can sometimes be found naturally or used in industrial processes.

Finally, there is the organic molecule CH_3Hg^+, which is monomethylmercury, often shortened to methylmercury ($MeHg^+$). This species of mercury is arguably the most dangerous and potentially has the most significant adverse health effects of all mercury species. Methylmercury is a mercury atom that is bonds to a methyl group. Organic mercury compounds are formed when mercury bonds with carbon, or a carbon based chemical group. A methyl group consists of a carbon atom connected to three hydrogen atoms (CH_3^-) (Ullrich 2007). Methylmercury has the ability to bioaccumulate and biomagnify within food webs causing neurodegenerative effects in wildlife and humans when ingested over time (Bank et al. 2012).

Mercury Cycling in Freshwater Systems

Elemental mercury is emitted into the atmosphere from fossil fuel combustion or natural sources such as forest fires or volcanic eruptions. In the atmosphere, it can oxidize through a number of chemical reactions into ionic mercury (Krabbenhoft and Rickert 2016). Once in its ionic form, it falls to the earth via wet or dry deposition (Selin 2009). It can either fall directly into a body of water, or land on terra firma and then washed into an aquatic system via runoff. Once ionic

mercury enters a body of water, it has three general transformation pathways (Figure 1). It can be reduced back into elemental mercury, and volatilize back into the atmosphere as a gas. The second pathway is its adsorption to sediments which collect at the bottom of lakes, rivers or reservoirs. Finally, ionic mercury can be methylated by sulfate reducing bacteria and converted into methylmercury (Fitzgerald and Lamborg 2007).

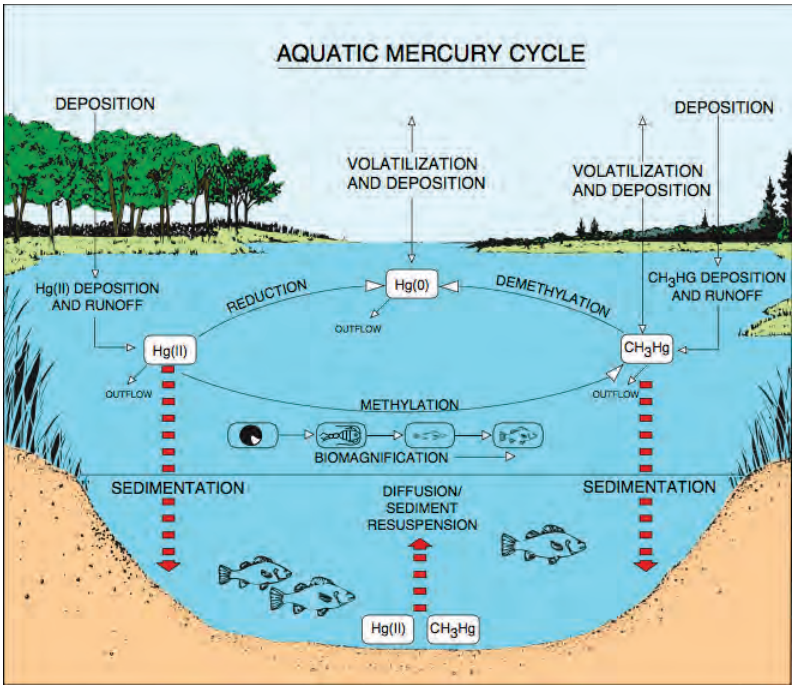


Figure 1. Mercury Cycle in Aquatic Systems (Krabbenhoft and Rickert, 2016)

In order for methylmercury to be formed, certain conditions must be met. Sulfate or iron reducing bacteria that thrive in anaerobic or sub-oxic conditions must be present (Strickman and Mitchell 2017). Anaerobic conditions are commonly found at the bottom of a body of water, near the sediment-water interface. In addition to an oxygen poor environment, high levels of dissolved organic carbon, relatively warm temperatures and low pH levels are required for these microbes to metabolize mercury (Strickman and Mitchell 2017). Once the ionic mercury is

methylated, methylmercury can be ingested by phytoplankton and biomagnify up the food chain and throughout the aquatic food web (Bank et al. 2012).

Mercury transformations in aquatic systems go in both directions. Any of these processes can be reversed, given the right conditions. Thus, there may be multiple forms of mercury in one aquatic system at any given time.

Why is Methylmercury an Environmental and Public Health Concern?

Methylmercury exposure is an environmental concern and public health concern because it has the ability to bioaccumulate and biomagnify up the food chain (Bareket et al. 2016). Bioaccumulation is the process when an organism uptakes a toxin faster than it can be removed from the body; while biomagnification is the increase in concentration of a toxin with an increase in trophic level. Methylmercury enters the food web via direct uptake from phytoplankton in aquatic ecosystems. The methylmercury makes its way up the food chain to zoo plankton, small fish, and then larger fish, resulting in fish tissue concentrations that are estimated to be 10^6 times higher than surrounding water concentrations (Selin 2009; Matthews et al. 2013; Bareket et al. 2016). Tertiary predators in aquatic ecosystems, humans included, are at greatest risk for exposure and most likely to experience negative effects from methylmercury due to its biomagnification (Matulik et al. 2017). Ergo, the main exposure route of methylmercury in people is through consumption of fish high in mercury levels. Globally over 1.5 billion people consume seafood as their main source of animal protein (Driscoll et al. 2013). Pregnant women and children have higher risk of exposure because methylmercury can cross the blood-brain and placental barriers. This can cause developmental and neurological defects in fetuses and young children (Selin 2009; Hinwood et al. 2013).

Aside from women of child bearing age and infants, adult males are also potentially at risk for methylmercury exposure. Recent epidemiological studies surmise that consumption of contaminated seafood in adult males leads to an increased risk of cardiovascular disease (Selin 2009; Driscoll et al. 2013). Cardiovascular disease is one of the leading causes for mortality in developed countries (Driscoll et al. 2013). However, further research is necessary to bolster this finding.

Other disproportionately exposed groups include immigrant communities, indigenous peoples and recreational anglers. Immigrant communities may eat their own catch it its entirety, including tissues or organs other than just the fillets, thereby increasing their exposure to methylmercury (Driscoll et al. 2013). Indigenous peoples may depend more heavily on subsistence fishing and a more restricted diet either due to cultural practices or lack of economic means to afford other foods (Driscoll et al. 2013). While recreational anglers often enjoy eating what they can catch, even if they are not economically disadvantaged. California has a culturally and economically diverse populace, with millions of people potentially at risk for methylmercury exposure.

Not only is methylmercury a public health concern, it is also an environmental pollutant that has deleterious effects on wildlife, especially piscivorous fish. Sub-lethal and lethal effects occur at concentrations between 5-10 μg/g (wet weight) of methylmercury. However, even levels as low as 0.3 μg/g in the entire body of a fish demonstrate negative effects (Driscoll et al. 2013; Scheuhammer et al. 2015). Increased MeHg concentrations in the tissues of fish can compromise reproduction of pregnant females, retard embryonic development, alter biochemical processes and damage tissues or cells within the bodies of fish (Selin 2009; Lamborg et al. 2014; Cheng et al. 2016). The health of fisheries and aquatic ecosystems are threatened by mercury exposure at environmentally relevant concentrations.

Research Objectives:

This paper has a number of research objectives. The first objective is to determine available remediation techniques to reduce mercury, and methylmercury pollution within freshwater lakes and reservoirs within the State of California. I evaluated these techniques for their efficacy at controlling or removing mercury from a freshwater system. Finally, this paper aims to determine the challenges environmental managers and policy makers will need to overcome in order to reduce mercury pollution within lakes and reservoirs in the State of California. In addition to these objectives, I developed recommendations from the literature to control mercury in the future, both locally and globally.

Methods

In order to achieve my research objectives, I conducted a literature review. I focused my literature review on scientifically peer reviewed journal articles, government reports, and book chapters. I investigated remediation strategies for mercury-contaminated sediments, specifically in lakes and drinking water reservoirs within the State of California. I also evaluated and compared remediation strategies and their potentially efficacy to either prevent, or remove mercury from aquatic systems. In addition to my primary literature review, I developed management strategies and recommendations related to prevention and removal of methylmercury from aquatic resources in California.

The following criteria are used to analyze each remediation method:

1. Type of Treatment
2. Cost (If applicable)
3. Level of Contamination
4. Time Scale to Decontamination/Mercury Control
5. Appropriate for California
6. Advantages
7. Disadvantages

In Situ Aeration and Oxygenation

Lake Stratification

In order for methylation of mercury to occur, anaerobic conditions must be present. In both the summer and winter seasons, lakes and reservoirs are stratified by temperature, creating distinct layers. This stratification allows for oxygen to diffuse into the top layers of a lake, but oxygen cannot diffuse into the bottom of a lake. In situ aeration and oxygenation is a remediation method to deliver oxygen to the bottom of lakes or reservoirs to prevent the methylation of mercury by sulfate reducing bacteria.

In both the summer and winter months, lakes and reservoirs on the West Coast of the United States will stratify into distinct layers, with summer lake stratification the most

pronounced, assuming no strong winds are present. Warm air temperatures heat the surface of the lake, and prevent the warm water from sinking and mixing with deeper layers. The stratification of a lake however, depends on its depth, size and shape. Deeper lakes will show clear separation of layers and small lakes may never stratify due to warm temperatures throughout and constant wind movement.

There are three common layers within lakes and reservoirs: epilimnion, metalimnion, and hypolimnion (Figure 2, Queensland Government 2017). The epilimnion is the top layer of a lake that is influenced by solar radiation and wind. This layer is relatively warm due to the proximity to solar radiation and therefore a lower density than deeper, colder water, causing it to remain on the surface. The middle layer is called the metalimnion with a rapid change in temperature. This layer divides the epilimnion and hypolimnion and contains the thermocline. In the summer months, the thermocline acts like a barrier and prevents the two layers from mixing by wind action. The deepest layer is the hypolimnion. This layer is cold, dense, dark and usually undisturbed, relative to the other two layers.

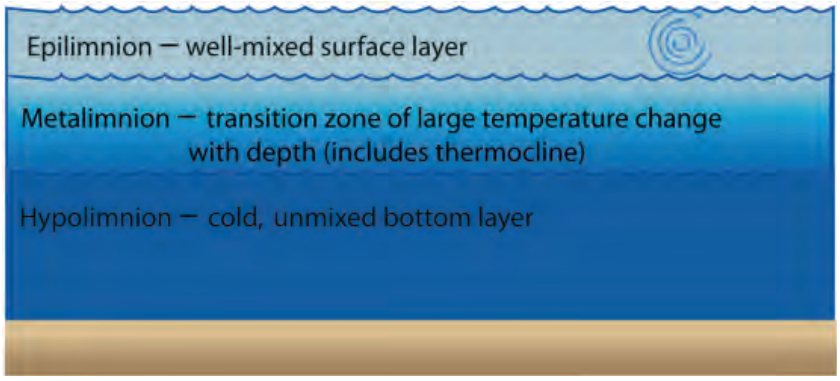


Figure 2. Stratification of Lake Zones (Queensland Government 2017)

A lake can also be classified distribution and its assemblage of biota, not only changes in temperature. The near shore section of a lake is the littoral zone, which is shallow and light can easily penetrate the bottom sediments (Figure 3, Illinois EPA 2017). Vegetation is abundant in this zone. The limnetic zone is an area of open, offshore water, next to the littoral zone. This zone is exposed to sunlight near the surface resulting in a high abundance of phytoplankton. The

profundal zone is the deepest zone with little to no biological activity, or access to light. Many sportfish species, like bass or perch live here (Whittier et al. 2001). Aquatic sediments that comprise the bottom of a lake or reservoirs are often called the benthic zone. Bottom dwelling organisms, like small crustaceans, mollusks and invertebrates reside here (Whittier et al. 2001). Often this layer has minimal plant life, due to the lack of sunlight.

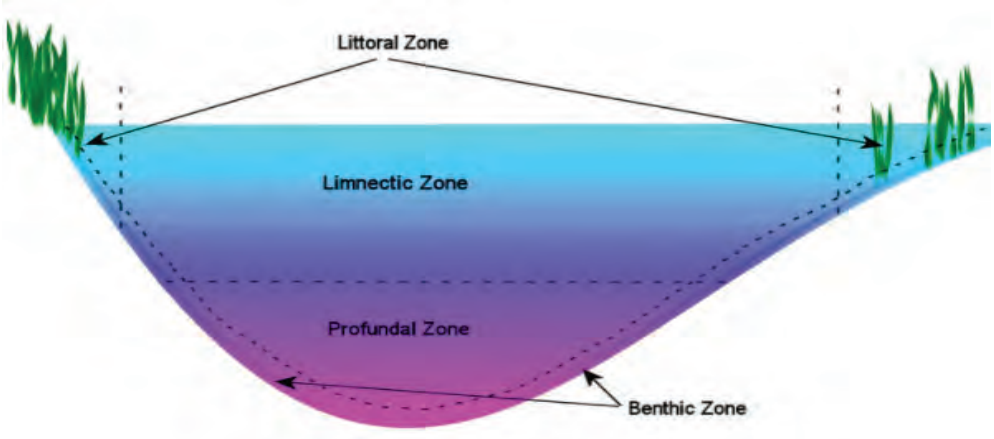


Figure 3. Biological stratification of lake layers (Illinois Environmental Protection Agency 2017)

Oxygen Availability in Lakes and Reservoirs

Oxygen concentrations within a lake are varied. This is due to the ability of gaseous oxygen to reach each distinct layer. Oxygen usually enters lakes in three ways, through atmospheric diffusion, photosynthetic action of plants and from inflow of streams depositing oxygen into the lake. The epilimnion has an abundance of oxygen from atmospheric diffusion, but the hypolimnion does not. The metalimnion acts like a barrier, preventing oxygen from diffusing into the hypolimnion. Since the hypolimnion is relatively deep, little solar radiation reaches this layer and oxygen production of photosynthesis does not occur. Any oxygen that reaches the hypolimnion is consumed by anaerobic bacteria and other microbes in the benthos until no oxygen remains.

High oxygen levels in lakes are imperative for the survival of cold water fish species and the prevention of eutrophication. Oxygen found in minimal levels (<2 mg/L) in a lake can be considered hypoxic, and depleted oxygen levels (0 mg/L) are considered anoxic (Beutel et al.

2014; McCord et al. 2016). The lack of oxygen in the hypolimnion creates conditions conducive for anaerobic, and sulfate reducing bacteria to convert inorganic mercury into methylmercury. The hypolimnion must be oxygenated to inhibit methylmercury production as will be discussed in the next section.

What is Hypolimnetic Oxygenation?

Hypolimnetic oxygenation (HOS) is an *in-situ* remediation method that increases oxygen levels found within the hypolimnion of lakes and reservoirs. Implementing this method increases dissolved oxygen (DO) levels in order to decrease methylmercury production in the hypolimnion and hopefully lower methylmercury bioaccumulation in fish. The process of HOS requires anoxic ambient water to be collected into a device, mixed with gaseous oxygen or ambient air, and then released back into the hypolimnion. HOS systems are often designed to meet the specific oxygen needs of the biota in each lake, however targeted DO levels are approximately 5 mg/L (McCord et al., 2016). HOS systems come in a variety of configurations, which can be suspended within the hypolimnion, or rest on the bottom of the lake at the sediment water interface (Beutel and Horne, 1999).

How Does Hypolimnetic Oxygenation Inhibit Methylmercury Production?

Oxygenation of benthic sediments and the hypolimnion may prevent the production of methylmercury through a variety of mechanisms. Sulfate reducing bacteria reduce sulfate (SO_4^{2-}) during their metabolic processes of breaking down carbon. This activity converts sulfate into sulfide (S^{2-}). Sulfate reducing bacteria (SRB) do not thrive in oxygenated waters. Therefore, the more oxygenated the water is, the fewer SRB's present. The methylation zone moves deeper into benthic sediments where the hypolimnion is oxygenated and makes it difficult for methylmercury to diffuse upwards and become bioavailable. If conversion of methylmercury is reduced or prevented, less of it will enter the food web and become a threat to tertiary biota and people. Oxic conditions promote the growth of aerobic bacteria that do not rely on the uptake of mercury or methylation of mercury as part of their biological processes.

Hypolimnetic Oxygenation Devices and Systems

Multiple types of HOS systems exist, the most common of which are either aeration or oxygenation. Examples of these systems include: airlift aerators, speece cones, and bubble plume diffusers. Airlift aerator systems pipe in ambient air or oxygen gas and expose it to lake water in a contact chamber (Figure 4 Chowdhury et al. 2014). Compressed air is pumped into the bottom of a vertical contact chamber, where it is mixed with hypolimnetic waters. Due to its positive buoyancy, the mixture rises through the contact chamber allowing air to diffuse into the water. In the separator box, the air can be off gassed and released into the atmosphere, while the newly aerated water is piped back down past the thermocline and deposited into the hypolimnion (Singleton and Little 2006).

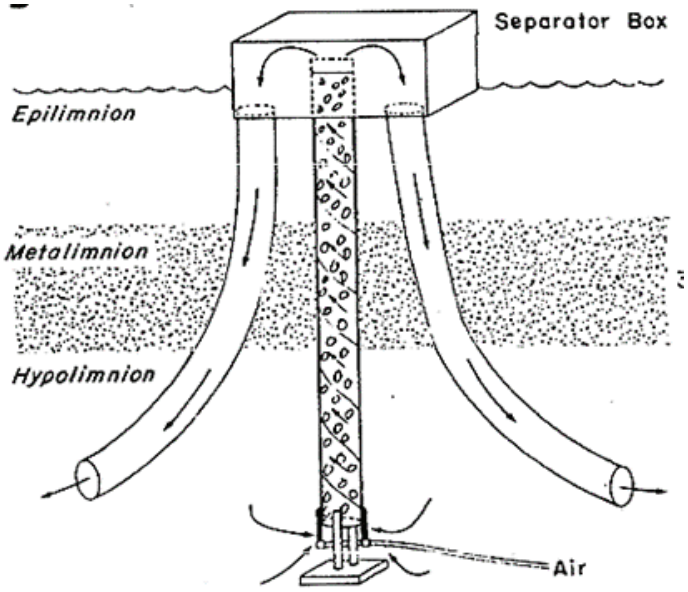


Figure 4. Simplified image of an airlift aerator (Chowdhury et al. 2014)

Another effective oxygenation method is to use a speece cone, originally known as a submerged down flow bubble contactor. This system consists of a conical holding tank, oxygen gas input, source of water and a diffuser, which releases oxygenated water into the hypolimnion (Singleton and Little 2006). Water is sucked into the device through an intake valve where it is pumped into the top of the cone. Here oxygen gas is pumped in and introduced at the neck of the

cone (Figure 5, Chortek 2017). The down flow of the water is stronger than that of the positively buoyant oxygen gas, preventing any gas from escaping and forcing mixing to occur. As the water flows down the sides of the cone, the flow rate slows, and the oxygen bubbles get smaller until they are fully diffused into the water. The oxygenated water is then released at the bottom of the cone through a diffuser back into the hypolimnion (Singleton and Little 2006).

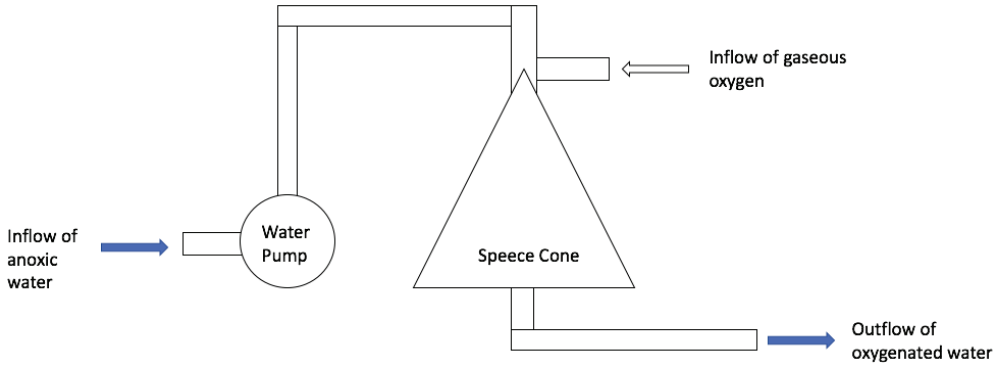


Figure 5. Drawing of conceptual speece cone (Chortek 2017)

Bubble plume diffusers can also be used to oxygenate the hypolimnion. Bubble plume diffusers consists of tubing with small holes where gas can escape into surrounding waters (Figure 6, Singleton and Little 2006). Bubble plume diffusers can either be circular or linear and can use either ambient air or oxygen gas. Gas flows slowly through the bubble plume diffusers and are ideal for deep lakes where the majority of bubbles will dissolve in the hypolimnion. This method does not disrupt the thermocline because the oxygenated water will float up until it is neutrally buoyant in the hypolimnion, and then flow horizontally outwards (Singleton and Little 2006). Disruption of the thermocline is possible with the other two devices (speece cone and airlift aerator) if managed improperly.

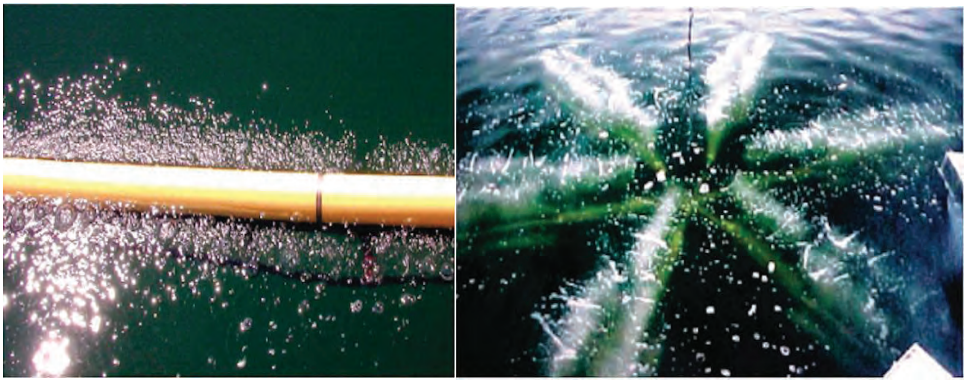


Figure 6. Bubble plume diffusers, linear (left) and circular (right) (Singleton and Little 2006)

Biological and Chemical Benefits of Maintaining an Aerobic Hypolimnion

The most favorable outcome of increasing oxygen within the hypolimnion is the fact that higher DO levels (≥5 mg/L) will limit the amount of mercury released into the reservoir. Oxic conditions do not favor the growth of sulfate-reducing bacteria. This means that other genera of bacteria, like denitrifying bacteria, will be dominant during these conditions. They do not methylate mercury as part of their biological processes.

There are a variety of biological and chemical benefits to maintaining an aerobic hypolimnion. Oxygenating the hypolimnion keeps all lake layers separated, and helps the profundal zone to remain cold. Keeping the hypolimnion layer cool provides necessary habitat for sportfish, like bass, and is also essential for other downstream biota, especially in the warm summer months. The cool profundal zone provides a refuge for zooplankton during the day in order to avoid predation (Beutel and Horne 1999).

In addition to biological benefits, maintaining an oxic hypolimnion also prevents the release of problematic chemical compounds that are usually adsorbed by sediments. Compounds can include iron (Fe^{2+}), manganese (Mn^{2+}), and sulfide (S^{2-}). These chemicals degrade the aesthetic quality and taste of drinking water. They also play a role in the methylation and release of mercury in an aquatic system (Beutel and Horne 1999). Maintaining an oxygenated hypolimnion also keeps iron and manganese oxides within surface sediments, slowing and sometimes preventing upward diffusion of methylmercury. These act as a sorption barrier to

upwardly diffusing methylmercury within benthic sediments (McCord et al. 2016). Most mercury is methylated within the upper most 10 centimeters of sediment, sometimes even within the top 3 centimeters (Ndungu et al 2016). A combination of an oxygenated hypolimnion and presence of iron and manganese ions further prevents methylmercury from entering ambient waters. The presence of iron and manganese and their compounds, in aquatic sediments may cause methylmercury to bind to these metals instead of being released into ambient waters.

Maintaining oxic conditions helps decrease the occurrence of eutrophication and decreases the release of ortho-P and ammonia from microorganisms. Orthophosphate (Ortho-P) and ammonia are unfavorable compounds that can be released during anoxic lake conditions (Beutel and Horne 1999). Ortho-P is a species of phosphate that is reactive within environmental systems, and when released can cause eutrophication since phosphorous is a limiting nutrient in California.

It is important to maintain oxic conditions in order to avoid this problem and avoid methylmercury conversion. Too much sulfide residing in hypolimnetic waters is problematic. During fall turnover, when lake layers completely mix, sulfide that was stored in the bottom of the lake is brought to the surface and the water column temperature mixes and becomes homogenous. This frees up the sulfide and hydrogen in the water and forms hydrogen sulfide (H_2S) due to the lack of oxygen and abundance of hydrogen. Hydrogen sulfide is a toxic gas that can cause fish kills. At moderate levels, sulfide can enhance the bioavailability of ionic mercury for methylation (McCord et al. 2016). Reducing sulfide concentrations in reservoirs will decrease mercury's bioavailability which in turn will reduce the amount of mercury phytoplankton uptake and decrease the amount of mercury entering into the food web.

Benefits of Implementing Hypolimnetic Oxygenation

Hypolimnetic oxygenation has been an effective method to control the release of methylmercury within four lakes in the Guadalupe River Watershed, San Jose. The four lakes are: Stevens Creek Reservoir, Guadalupe Reservoir, Calero Reservoir and Almaden Reservoir. The Guadalupe River Watershed is a complex hydrologic system that is contaminated by the New Almaden mercury mine, the largest mercury producer in North America (McCord et al. 2016). The installation and use of an HOS system in these lakes is to reduce hypolimnetic methylmercury

concentrations and thereby reduce mercury concentrations in biota. HOS systems delivered 5 mg/L of pure oxygen gas to the hypolimnion during the summer months of operation. With this system in place, Calero Reservoir mercury levels decreased to 1.5 ng/L (McCord et al. 2016). Results for the three other lakes are still being calculated.

Implementing HOS systems into a mercury contaminated lake yields some energy and monetary benefits. HOS systems are run during spring and summer months, when thermal stratification is most pronounced. During the cooler winter months, mercury methylation is not as prolific and lakes are not as biologically active. This means that HOS devices do not need to be run year-round, only 6-8 months out of the year. Thus, decreasing energy requirements, decreasing costs and potential emissions from energy use are all benefits of HOS installation.

The efficiency of an HOS system can be increased by substituting compressed air for pure oxygen gas. By using pure oxygen gas, rather than ambient air, profundal waters are better oxygenated. Injections of pure oxygen gas can deliver 60-80% more dissolved oxygen than ambient air (Beutel and Horne 1999) (Ashley et al. 2014). By using pure oxygen gas, rather than ambient air, profundal waters are better oxygenated. Using ambient air, which is comprised of about 70% nitrogen, may cause bottom waters to be supersaturated with nitrogen gas and further exacerbate anoxic conditions (Beutel and Horne 1999).

Challenges of Implementing Hypolimnetic Oxygenation

There are a number of challenges that need to be overcome when implementing hypolimnetic oxygenation systems in anoxic lakes and reservoirs, including timing and initial oxygen levels. HOS systems are designed to meet oxygen demand, not overcome a deficit. Thus, it is imperative that HOS systems are initiated before hypoxic conditions set in. HOS systems are designed to deliver a set amount of oxygen and keep ambient waters at a particular level, not to overcome excess biological or chemical oxygen demand within a reservoir (McCord et al. 2016). Ideally, these systems would be installed and running in the spring, but no later than the beginning of summer when thermal stratification begins and oxygen levels at the profundal zone begin to decline.

Ideally, HOS systems should be installed in the benthic zone or on the sediment-water interface. Installing HOS devices in the profundal zone allows for small hypoxic gaps to develop, even if the rest of the hypolimnion is well mixed due to the upward lift of bubble plumes

(McCord et al. 2016). Lateral diffusion should also be incorporated into future HOS designs of aeration devices, in order to minimize potential hypoxic gaps and areas for further mercury methylation.

Another challenge with HOS is the potential for increased turbulence between lake layers. Excess turbulence and destratification of layers potentially releases methylmercury from the hypolimnion into the epilimnion, allowing it to become bioavailable. There should be a balance between oxygen delivery and induced turbulence. A high flow of gas, and higher rate of diffusion from an HOS device increases oxygen levels within the hypolimnion. This increased flow rate also increases turbulence between the hypolimnion and the rest of the layers in the lake (McCord et al. 2016). Too much turbulence may erode the thermocline mixing all layers within the lake. This mixing increase temperatures throughout the lake and may release mercury into upper layers of the lake where it is more accessible to biota. High diffusion rates may increase oxygen levels in the reservoir, but increase mercury exposure in biota, rendering this technique ineffective at mitigation of both aqueous mercury concentrations and mercury uptake in phytoplankton.

In Situ Aqueous Capping

Contaminated sediments can be immobilized and isolated via in situ aqueous capping (Figure 7 Chortek 2017; Randall and Chattopadhyay 2013). Capping is a well-tested method and can be an effective remediation option. Contaminants are covered from ambient waters by the cap, thereby decreasing the risk of release into upper waters. An aqueous cap provides a complete seal between the aquatic environment and contaminated sediment. A chemically active cap also provides sorption or chemical isolation of dissolved metals, like activated carbon (Randall and Chattopadhyay 2013). Physical, and sometimes chemically reactive barriers are placed on a site to contain contaminated soils in place (EPA 2017). Physical barriers prevent the movement of benthic organisms, namely invertebrates, and prevent predators from consuming these contaminated organisms, thereby preventing bioaccumulation of mercury in the food chain (Cassidy et al. 2002). Both chemical and physical caps can stabilize the benthic sediments and prevent erosion. Barriers that are used can be natural or man-made and they can be comprised of sand, gravel, clean sediment or man-made layers, like geotextiles (EPA 2017). Geotextiles are

permeable material used for soil stability commonly made from polypropylene or polyester (Mizkowska et al. 2017). They are included in caps to make them more effective.

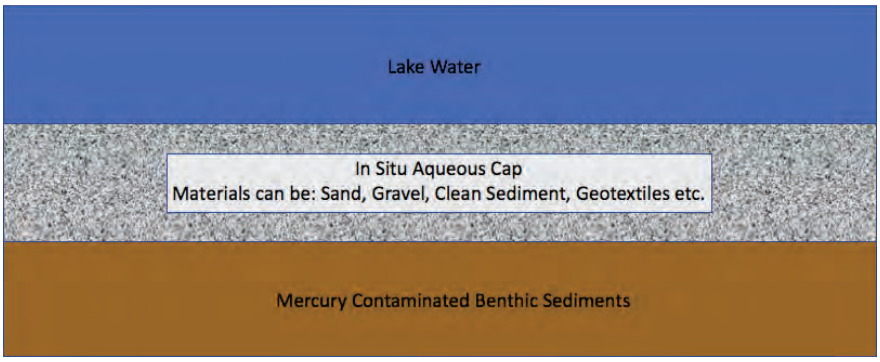


Figure 7. Drawing of an in situ aqueous cap (Chortek 2017)

To evaluate the effectiveness of a physical cap and biointrusion prevention, researchers from Western Michigan University conducted a number of experiments in 2002 in the Great Lakes Drainage Basin. An in situ aqueous cap was placed in Gull Creek, Michigan, in order to control the bioaccumulation of mercury by stopping biointrosion and erosion (Cassidy et al. 2002). This method prevents the vertical movement of benthic organisms, and prevents fish from feeding in contaminated sediments, thereby decreasing erosion and bioaccumulation of mercury. A geotextile layer was placed on top of contaminated sediments with an additional 3 cm of sand and pea gravel to hold the cap in place (Cassidy et al. 2002). At the end of the seven-month experiment, approximately 4.26 ± 2.47% of benthic organisms were able to pass through the cap, demonstrating a successful means to control biointrusion and mercury bioaccumulation via aqueous capping (Cassidy et al. 2002).

Benefits of Implementing In-Situ Aqueous Capping

If the remediation site is small and shallow in depth, aqueous capping is much more cost effective than in situ dredging and disposal. In addition, in situ aqueous capping also has the added benefit of low environmental impacts. This method causes minimal disturbance to existing ecosystems, minimizes transport of contaminated sediments and lowers the risk of resuspension of contaminated sediments (Wang et al. 2004). Capping stabilizes sediment, decreases erosion

and transport of contaminated sediment and is most effective when movement of hydrologic flows are minimal (EPA 2017). In-situ aqueous capping would be ideal for a lake or reservoir that has minimal disturbances from human activities and low winds.

Capping and its materials, have the added benefit of passively sorbing other problematic heavy metals, besides mercury. Contaminated sites often have concentrations of heavy metals including but not limited to: lead, chromium, arsenic, zinc, cadmium and copper (Wuana & Okieimen 2011). Depending on the materials the cap is comprised of, heavy metals can be stabilized and removed from surrounding water. Common capping materials include clean sediment, clay, cement and zeolites (Wuana & Okieimen 2011). Each material used has a different immobilization mechanism, whether that is chemical adsorption, precipitation or formation of more stable complexes which prevent heavy metals from being released from beneath the cap.

Challenges to Implementing In-Situ Aqueous Capping

The main challenge of in situ aqueous capping is that it does not remove mercury species from the contaminated site. It is designed to isolate and immobilize mercury from coming into contact with ambient water and biota, not remove it from a system. Capping may reduce the amount of mercury that is available for uptake, but it does not remove mercury from an aquatic system.

The in situ aqueous capping method is appropriate for sites with low hydrodynamic flows, like lakes, reservoirs and bays (Wang et al. 2004). Sites with strong groundwater flow, tides, storms, wind, shipping etc. may scour the cap and rerelease the contaminated sediment (Wang et al. 2014) (Randall and Chattopadhyay 2013). Proper evaluation of environmental factors is critical before installing a cap, to insure the cap will be effective. Even with ideal site conditions and the ability to sorb additional problematic heavy metals, ongoing monitoring of in situ aqueous caps is necessary. This is to ensure the remediation activities are effective and further action is not needed.

One big drawback to in situ aqueous capping is that mercury may continue to be methylated under the cap if organic matter is available. Methylation occurs mostly in the upper 15 centimeters of benthic sediments. To be highly effective, the cap should be greater than 10 centimeters. This can physically prevent mercury from passing through the cap and potentially

allow methylmercury to sorb to materials within the cap, further preventing it from reaching ambient waters (Randall and Chattopadhyay 2013; Ndungu et al 2016). High organic matter content in the cap can also provide conditions ideal for SRBs (Ndungu et al. 2016). To avoid this, the in-situ cap should be comprised of low organic matter to decrease the potential of methylmercury formation (Ngungu et al. 2016).

In addition to low organic content, the cap must be sufficiently thick and include sorptive materials. Puncturing of a cap is only an issue if the cap itself is thin. Caps can be compromised by hydrological flow or biologic activity. Benthic organisms also create holes in the cap due to their activities (Wang et al. 2014). Therefore, it is important to make sure the cap is sufficiently thick and includes sorptive materials to minimize the amount of mercury that may be released into the ambient water. Geotextiles with activated carbon in them are an ideal choice for capping due to their ability to sorb mercury to these materials (Ndungu et al. 2010).

In-situ aqueous caps may not be an effective remediation method in all cases. The cost to place an in-situ cap can be very expensive for large scale sites (greater than 1000 acres). Installation itself can cost $\$25/m^2$. This does not include the cost of the materials themselves (Randall and Chattopadhyay 2013). Total capping costs on average are estimated to be $600,000 (Henry 2000).

In Situ Dredging

Dredging is an in-situ remediation method that removes contaminated sediments from a site. There are two types of dredging: mechanical and hydraulic. Mechanical dredging is the removal of sediment by scooping or digging with a clamshell bucket (Figure 7; Randall and Chattopadhyay 2013; EPA 2017). This method is ideal for sediments that are hard, dense, or clay like. Hydraulic dredging is the removal of a liquid slurry that is comprised of a mixture of water and sediment (EPA 2017). This method is ideal for sediments comprised of finely grained materials. The slurry is suctioned up and out of the site. Once on land, the water has to be removed from the collected sediments, also called dewatering. If contaminated, the water must be treated and then the disposed sediments are transported off site and then either decontaminated or buried.



Figure 8. Hydraulic dredging (top), mechanical dredging (bottom) (Torres et al. 2014; Clearwater.org 2017)

Benefits Associated with In Situ Dredging

One of the greatest advantages of dredging compared to the other remediation methods is that it can remediate large amounts of contaminated sediments. Dredging might be ideal for contaminated sites that are large in size, or have high concentrations of a contaminant (Wang et

al. 2014). A site in Minamata Bay, Japan, used dredging as a remediation technique successfully. Inorganic and methylmercury were released directly into Minamata Bay as byproduct from the production of acetaldehyde from 1932 to 1968 in a nearby chlor-alkali plant (Akito et al. 2014). What ensued in years after were severe cases of mercury poisoning, and eventual diagnosis of Minamata disease in the mid 1950s due to the consumption of contaminated seafood. To minimize the risk of exposure to mercury, Minamata Bay and its bottom sediments were hydraulically dredged from 1977-1990. Mercury sediment concentrations ranged from 0.04 ppm to 553 ppm before dredging began (Akito et al. 2014). After dredging was completed, average mercury sediment concentrations were estimated to be 0.06-16 ppm (Akito et al. 2014). In this case, dredging was an effective way to quickly remove severely contaminated sediments and drastically improve both sediment and water quality within Minamata Bay. Dredging contaminated sediments within California lakes or reservoirs would be ideal if there is evidence of very high mercury concentrations, or if a large number of subsistence fishing populations were at risk of exposure.

There are also a number of other benefits associated with hydraulic and mechanical dredging. Hydraulic dredging is ideal for narrow water bodies and can be used in shallow waters ($\leq$ 9 m), making this method versatile and can increase accessibility to contaminated sites (Ragnarsson et al. 2015). It also has the added benefit of easily removing sand, silt and fine pore sediments, which are often found as benthic media in lakes. In contrast to the removal of fine grain sediments, mechanical dredging is ideal to remove rocky or coarse debris from lakes (Randall and Chattopadhyay 2013). In addition to easy removal of sediments, hydraulic dredging is also less likely to suspend contaminated sediments. The strong pump and hose mechanisms act like a vacuum, efficiently removing sediments from the lake bottom. Both dredging methods are efficient at removing unwanted contaminated sediments from freshwater systems.

Challenges Associated with In Situ Dredging

The in-situ dredging poses many challenges as a remediation method for mercury. It is expensive and the disposal process can take a long time. Disposal sites may leak and release the contaminant, trading one cleanup site for another. This method removes contaminated sediment, cleans up one site, and then raises the issue of where to dispose or contain contaminated

sediments once removed. There is also the potential for leakage and contamination of the storage site if proper precautions are not taken.

There is also a high risk for resuspension of sediments when sediment is being dredged. Dredging causes high disturbances to the aquatic environment. This could release mercury in the upper layers of a lake, exposing biota to methylmercury. Mercury could be transported downstream through outlet streams or enter into groundwater (Want et al. 2004). Dredging activities should be slow to minimize the disturbance of sediment. If dredging activities are not slow, this remediation strategy may increase turbidity of the water, which can inhibit photosynthetic activity of plants and increase water temperatures if severe enough.

Dredging can also cause oxidation of anoxic sediments, releasing contaminants that were sorbed to sediments (Wang et al. 2014). This temporarily increases conditions that cause the release of sulfate and organic matter, which favors methylmercury production (Wang et al. 2014). Therefore, dredging activities should be monitored both during active dredging, and post dredging to prevent the release of problematic compounds.

Both mechanical and hydraulic dredging can be an expensive method of mercury remediation, as specialized equipment is required for both types of dredging operations (Wang et al. 2014). Mechanical dredging requires a trained operator, clamshell bucket and arm, and barge or platform for the machine to sit on while it is excavating sediments. Hydraulic dredging also requires a trained operator, suction arm to uptake sediments, pump and tubing to carry sediments to the dewatering site.

In addition to equipment costs, physical transport and removal of sediments can be costly. Excavation of sediments can cost up to $\$1409/m^3$ (Wang et al. 2014). This can be costly if there is a large volume to remove and clean. After dredging a site, future monitoring is necessary to verify an acceptable amount of the contaminant has been removed. Monitoring, while necessary, adds an additional cost to an already expensive project. In situ dredging removes mercury that is deposited via atmospheric deposition or point source pollution. It does not reduce the sources of atmospheric mercury and its exorbitant cost makes this remediation method cost-prohibitive if dealing with low contamination, or small-scale sites.

Phytoremediation

Phytoremediation is a method that uses plants to uptake heavy metals, like mercury, to reduce contamination of ecological sites (Henry 2000). Phytoremediation permanently removes mercury from the surrounding environment and stores it in adjacent plant biomass. Ideally, the plant species used would extract high concentrations of heavy metals into their roots and produce a large quantity of plant biomass (Henry 2000). The plant species used must have the ability to tolerate high levels of mercury in their system. The efficacy of this treatment method depends on the concentration of the contaminant, contaminant species of mercury, the dispersal of mercury within the environment and timeframe for a site to be cleaned up.

A pilot scale laboratory experiment conducted by Marrugo-Negrete et al. (2017) demonstrated the effectiveness of using yellow velvetleaf (*Limnocharis flava*) as a cost effective and easy way to remediate gold mine effluent and mercury contaminated water and sediments. Over a thirty-test day period it was recorded that the removal rate of mercury was based on exposure time. The longer the plants were exposed to contaminated media, the more mercury was removed, with up to 90% of the mercury present sequestered in the plant biomass (Marrugo-Negrete et al. 2017). The results from this study are indicative of the yellow velvet leaf as a mercury accumulator and species capable of remediation mercury contaminated water and sediments.

Benefits of Implementing Phytoremediation

There are a number of benefits to implementing in situ phytoremediation as a way to control the release of mercury in the environment. One major advantage to implementing phytoremediation is that it is a non-invasive strategy like nitrate additions or HOS. Unlike capping or dredging, phytoremediation does not cause sediment resuspension or disturbance of contaminated soils. This further minimizes the risk of mercury release into the water column, and subsequent uptake into phytoplankton and bioaccumulation. Sites that are ideal for phytoremediation include ecologically sensitive sites, with low mercury concentrations.

Phytoremediation is an easy method to implement. It does not require specialized heavy equipment or personnel, unlike capping or dredging activities. The average citizen is capable of

planting or transplanting the appropriate species on the site, however they must wear personal protective gear.

This ease of implementation also translates into a reduced cost compared to capping, dredging and off-site storage. One acre of contaminated sandy loam, (50 cm in depth) is estimated to cost between $60,000 and $100,000 to treat with phytoremediation versus $400,000 to dredge and dispose of the same quantity (Henry 2000). In addition to reduced monetary costs, in situ phytoremediation also decreases the amount of waste that has to be disposed of at hazardous waste landfills by ninety five percent (Henry 2000). This significantly reduces the cost of a phytoremediation project, especially since mercury contaminated soils are considered hazardous waste by RCRA (Henry 2000).

In situ phytoremediation may help sequester other heavy metals or problematic contaminants. This method can be used for a number of chemical compounds, including but not limited to chlorinated solvents, pesticides, cadmium, lead and chromium (Table 3 Henry 2000). *Juncus maritumus,* commonly known as a sea rush, has a high capacity to uptake mercury in sediments (Randall and Chattopadhyay 2013). More research is needed to see if multiple compounds can be sequestered by these species, and how quickly sequestration occurs.

Table 2. Chemical compounds that are amenable to phytoremediation (Henry 2000)

Organics	**Inorganics**
Chlorinated Solvents TCE, PCE, MTBE, carbon, tetrachloride	Metals B, Cd, Co, Cr, Cu, Hg, Ni, Pb, Zn
Explosives TNT, DNT, RDX, and other nitroaromatics	Radionuclides Cs, ^{3}H, Sr, U
Pesticides atrazine, bentazon, and other chlorinated and nitroaromatic chemicals	Others As, Na, NO_3, NH_4, PO_4, perchlorate (ClO_4)
Wood Preserving Chemicals PCP and other PAH's	

Challenges of Implementing Phytoremediation

Phytoremediation has some serious challenges that must be overcome when considering this method for the decontamination of mercury. Phytoremediation is a slow process and can take years or decades to effectively remove mercury contamination from lakes. Furthermore, there are a limited number of plant species that can tolerate the uptake of mercury, like *Juncus maritumus* or hyacinth species, many of which are invasive (Skinner et al. 2007). More research is necessary to identify a larger number of plant species that tolerate mercury uptake, native to the region of California and that uptake mercury quickly.

There may be unintended consequences of the plant species affecting local biodiversity. Not all contaminated sites are suitable for the plants used in phytoremediation. The introduction of non-native or invasive plants may unfavorably alter local ecological community structure and food webs. There is also the concern that non-native plants may not have the appropriate adaptations to local climate. This may affect the production of plant biomass. The lower the biomass that is produced, the less mercury, or other heavy metals that will be removed from the contaminated lake (Henry 2000). Phytoremediation is also limited to the rooting depth of the plants. Mercury can only be removed as far as a plant's rooting system extends. This is not ideal if a site has deep contamination.

There is a concern that if the plants successfully sequester mercury, herbivorous animals may ingest the toxic plant biomass and expose themselves to mercury. Further research is necessary to see if this phenomenon is of biological concern. This may accidentally introduce more mercury into the food web, rendering phytoremediation possibly counterproductive.

What happens to the mercury when the plants die off? Plants that sequester heavy metals, mercury included, have a limited life span. Once they die, they are then considered hazardous waste and need to be removed and contained properly by RCRA standards (Henry 2000). If phytoremediation is going to be an effective method of remediation, these plants must be harvested before they completely decompose and rerelease the sequestered mercury back into the environment.

Chemical Additions

Chemical additions to lakes are a fairly new approach to control mercury concentrations in contaminated sites. These additions of chemicals, like calcium nitrate solution, rely on manipulating reducing-oxidizing conditions within a lake to prevent the methylation of mercury. There are a number of hypothesis as to how this is exactly done. The three-main hypothesis are that nitrate additions alter the methylation and demethylation rate in aquatic systems. The second posits promotes the growth of denitrifying bacteria, that outcompete sulfate reducing bacteria. And the last mechanism suggests that the addition of nitrate increases methylmercury sorption to iron and manganese oxyhydroxides, rendering the mercury unavailable to uptake by phytoplankton due to the amalgams physical size.

Environmentally Relevant Reducing-Oxidizing (Redox) Conditions

Nitrate additions depend on manipulating aquatic redox reactions to prevent the methylation of mercury. Depending on abiotic conditions within an aquatic system, microorganisms will consume compounds during their metabolic processes (Figure 7 Baker et al. 2000). Redox reactions are a type of chemical reaction that involve the transfer of electrons. These reactions always occur in pairs, in which one substance is oxidized, and the other substance is simultaneously reduced. The process of oxidation is described as the loss of electrons (Baker et al. 2000), whereas the process of reduction is the gaining of electrons (Baker et al. 2000). Oxidized chemical forms are represented in a circle in Figure 7 while reduced chemical forms are represented in a diamond.

During metabolic processes, microbes will actively consume compounds that have a high free energy charge. Microbes will select the next most energetic oxidant in the sequence (if oxygen is depleted) to metabolize organic matter via aerobic respiration (Figure 7 Baker et al. 2000). Oxygen is the first compound to be consumed during a redox reaction because it has a high free energy change and is a strong oxidizing agent (Baker et al. 2000). Once oxygen is depleted in the benthic layer of a lake, anaerobic microbes outcompete aerobic microbes due to lack of oxygen. They first consume nitrate, then iron, then sulfate, and finally methane in that order (Figure 7 Baker et al. 2000).

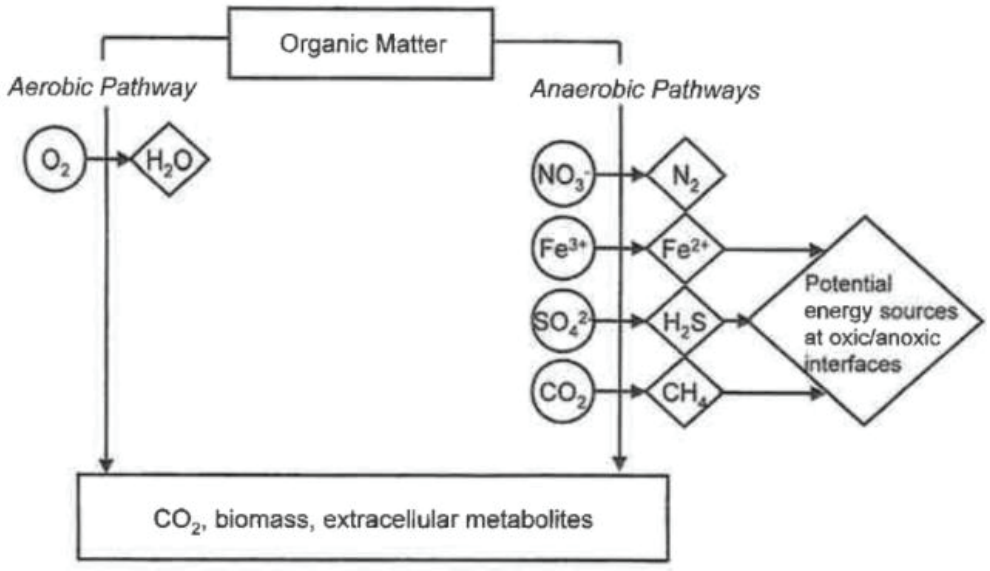


Figure 9. Sequence of important environmental oxidants through aerobic and anaerobic pathways (Baker et al. 2000)

Once the oxygen has been consumed at the sediment water interface, and becomes sub-oxic, other chemical compounds are oxidized for microbial metabolic processes. Each subsequent compound will produce less energy than the previous. In addition to oxygen, nitrate is the strongest available oxidizing agent. Nitrate (NO_3^-) is reduced, and converted into nitrogen (N_2) by anaerobic nitrogen fixing bacteria in the process of denitrification. Once both oxygen and nitrogen species are consumed, metals are then used for metabolic processes. Commonly reduced metals are both iron and manganese. Ferric iron (Fe^{3+}) is reduced to ferrous iron (Fe^{2+}). This process is facilitated by iron reducing bacteria that may also have the capacity to methylate mercury. After iron is reduced, then sulfate (SO_4^{2-}) is reduced into hydrogen sulfide (H_2S or HS^-) by sulfate reducing bacteria. These bacteria are responsible for the methylation of mercury in anaerobic conditions. Then lastly, methanogenesis occurs in a reaction that reduces CO_2 to CH_4. This reaction occurs under the most anaerobic conditions, if all other oxidants are in low quantities or are depleted. Methanogenesis occurs in swamps, rice paddies, and flooded areas that are frequently or permanently flooded. As each subsequent compound is used for respiration, less and less energy is produced (Figure 8 Baker et al. 2000).

Reaction	Reductive processes equation	Free energy $\Delta G^o(w)$ (kcal)
Aerobic respiration	$CH_2O + O_2 = CO_2 + H_2O$	−120.0
Denitrification	$CH_2O + (4/5)NO_3^- + (4/5)H^+ = (7/5)H_2O + (2/5)N_2 + CO_2$	−113.9
Mn(IV) reduction	$CH_2O + 2MnO_2 + 4H^+ = 2Mn^{2+} + 3H_2O + CO_2$	−81.3
Fe(III) reduction	$CH_2O + 8H^+ + 4Fe(OH)_3 = 4Fe^{2+} + 11H_2O + CO_2$	−27.7
Sulfate reduction	$CH_2O + (½)SO_4^{2-} + (½)H^+ = (½)HS^- + H_2O + CO_2$	−25.0
Methanogenesis	$CH_2O + (½)CO_2 = (½)CH_4 + CO_2$	−19.2
Fermentation	$CH_2O + (1/3)H_2O = (2/3)CH_3OH + (1/3)CO_2$	−8.6

Reaction	Oxidative processes equation	Free energy $\Delta G^o(w)$ (kcal)
Methane oxidation	$O_2 + (½)CH_4 = (½)CO_2 + H_2O$	−97.7
Sulfur oxidation	$O_2 + (½)HS^- = (½)SO_4^{2-} + (½)H^+$	−95.0
Fe(II) oxidation	$O_2 + 4Fe^{2+} + 10H_2O = 4Fe(OH)_3 + 8H^+$	−92.3
Nitrification	$O_2 + (½)NH_4^+ = (½)NO_3^- + H^+ + (½)H_2O$	−41.7
Mn(II) oxidation	$O_2 + 2Mn^{2+} + 2H_2O = 2MnO_2 + 4H^+$	−38.6

Figure 10. The sequence of redox reactions in aqueous environments and their respective free energy (Baker et al. 2000)

Nitrate Addition as a Remediation Strategy

Understanding environmental redox conditions are essential in knowing how chemical additions, such as nitrate, control the methylation of mercury in an aquatic system. Using chemicals as an additive to prevent the conversion of mercury is a novel in situ remediation approach, with the most common additive being nitrate (NO_3^-), specifically calcium nitrate ($Ca(NO_3)_2$) (Matthews et al. 2015). This technique is currently being investigated on the East Coast of the United States within lakes and reservoirs contaminated by mercury.

There are a number of mechanisms for regulating the release of methylmercury through the use of chemicals additions. The addition of nitrate prevents an aquatic system from entering heavily reduced conditions, whereas additions of iron and sulfate are the main chemicals that facilitate metabolic activity of microbes. The addition of nitrate has been shown to prevent the production of methylmercury in aquatic systems (Matthews et al. 2013). Nitrate is a strong oxidizing agent, and ideal for the consumption of organic matter by microbes if oxygen is not

readily available. Adding nitrate into a lake or reservoir promotes the growth of denitrifying bacteria as the dominant active microorganisms within an aquatic system and prevents dominance of SRB from becoming the dominant and active species (Matthews et al. 2013). Denitrifying bacteria are not capable of mercury methylation, unlike iron, or sulfate reducing bacteria (Cleckner et al. 1999). This suppresses the growth of SRB and little methylmercury is produced. In addition, this mechanism suppresses both iron and manganese reduction and inhibits anaerobic metabolic pathways.

Another posited mechanism for nitrate control on methylmercury accumulation in aquatic systems is the increased sorption of methylmercury to iron and manganese oxyhydroxides in benthic sediments. Under aerobic conditions, ferric iron (Fe^{3+}), the oxidized form, is the dominant iron species. Under anaerobic conditions, ferrous iron (Fe^{2+}), the reduced form of iron is dominant. Ferrous iron is commonly found in anoxic waters and is water soluble. In reduced conditions, it stays in solution and iron reducers will produce ferrous iron through their metabolic activities. For nitrate additions to be effective, it is important to ensure the aquatic system favors ferric iron as the predominant form of iron. This form is not water soluble and precipitates out of the dissolved phase as a particulate. Ferric iron is now available to bind with water molecules, hydroxides (OH^-), and organic matter. These clusters of compounds form flocculants, which attracts methylmercury and sticks to the flocculent. Oxyhydroxides have a large surface area, so many methylmercury atoms can stick to it. At this point, the flocculent is too big for phytoplankton to passively or actively take up into their cell walls, preventing methylmercury from entering the food web. Once sorbed to the iron or manganese oxyhydroxide, methylmercury is not biologically available for uptake.

Benefits of Implementing Nitrate Addition

The addition of nitrate into a mercury-contaminated body of water is a novel remediation method. This method relies on manipulating redox conditions within a lake to prevent the methylation of mercury, and subsequent release into the food web. Nitrate addition promotes the growth of denitrifying bacteria and their consumption of nitrate for their metabolic processes. Denitrifying bacteria are not known for their methylating properties. With appropriate redox conditions the methylation of mercury is prohibited. Conditions in these lakes are more likely to

be in an oxidized state and water quality improves. This also has the added benefit of preventing the release of iron and manganese that reduce the aesthetic quality of drinking water. The sorption of iron, manganese and sulfide stays bound to sediments or other compounds, which are not released into ambient drinking water, causing poor taste and smell.

Nitrate additions have been used to successfully control mercury methylation in the State of New York at Onondaga Lake in 2011. A local chlor-alkali plant discharged 75,00 kg of mercury into the lake contaminating aquatic biota and benthic sediments (Matthews et al. 2013). To remediate the lake, a liquid calcium nitrate solution was added to the hypolimnion three times per week from June 30 to October 10 to control the release of methylmercury. At the end of this pilot study methylmercury levels had decreased by 95% from previous levels recorded in 2009 (Matthews et al. 2013). It was also noted that during fall turnover, methylmercury concentrations were not apparent, demonstrating a successful control of methylmercury release in Onondaga Lake (Matthews et al. 2013).

Nitrate additions are not a cost prohibitive remediation method like dredging. Both solid and liquid calcium nitrate solutions can be easily purchased. Typical calcium nitrate solutions can approximately cost $2.00 to $20.00 per gallon (USP Technologies, 2017). However, total costs will depend on: the volume of lake water that needs to be treated, how often this lake water needs to be treated, the initial mass of calcium nitrate, tap water that is combined with calcium nitrate to form a calcium nitrate solution, and subsequent delivery method into the lake (hose or pump system).

Challenges of Implementing Nitrate Addition

There are a number of challenges when adding nitrate to a mercury contaminated lake or reservoir. Within the State of California, excess nitrogen is problematic. California is responsible for producing more than one third of the vegetables in the United States and two thirds of the country's fruits and nuts (CDFA 2016). Vast amounts of farmland are required to produce such a large crop volume, which need a large amount of nitrate based fertilizers. Excess nitrate that is used to fertilize crops runs off into nearby waterways during heavy rainfall events. This runoff will eventually drain into larger rivers or waterways, causing eutrophication and hypoxic conditions downstream. This extra nitrogen can cause rapid growth of aquatic plants and algae in

California's lakes. When plants and algae respire, and decompose, they consume oxygen in the water leading to hypoxia, fish kills and eutrophication. Such conditions are favorable for the methylation of mercury and growth of sulfate or iron reducing bacteria, thereby increasing methylmercury concentrations in lake water.

Excess nitrogen is also problematic if it enters groundwater aquifers or reservoirs used for drinking water and human consumption. If humans, especially infants, consume water with excess nitrogen, they can contract blue baby syndrome. Nitrate is consumed and then converted into nitrite in the stomach or digestive system (Knobeloch et al. 2000). Nitrite is responsible for oxidizing the hemoglobin in red blood cells, which is then transformed into methemoglobin (Knobeloch et al. 2000). Methemoglobin is unable to transport oxygen like hemoglobin. This condition prevents the blood from moving oxygen into the body's cells, causing a blue coloration in babies. This is especially concerning because nitrate contamination and exposure mainly occurs through consumption of private well water, of which sixteen percent of the US population depends (Manassaram et al. 2006).

Nitrate addition for remediation of mercury is problematic for both environmental and human health reasons. The addition of excess nitrate in lakes and reservoirs causes eutrophication in the State of California, since nitrate is limiting. People who consume water with excess nitrogen can contract blue baby syndrome. These environmental and human health outcomes may not be worth the risk. Nitrate addition may suppress the production of methylmercury, but produces nitrogen, which is already a problematic surface and groundwater contaminant.

Comparative Analysis of Remediation Methods

Implementation of mercury control in lakes and reservoirs is a complex matter. Each method discussed previously has a number of advantages and disadvantages to its implementation remediation of mercury within lakes and reservoirs. Environmental managers and policy makers will have to critically analyze all benefits and drawbacks when choosing a remediation method. A number of important criteria have been chosen to compare benefits and challenges. They are equally weighted and are listed in no particular order. Table 3 presents a summary of results of the comparative analysis of remediation methods.

Table 3. Summary of Comparative Analysis of Remediation Methods

Method	Type of Treatment	Cost	Level of Contamination	Time Scale to Decontamination/ Hg Control	Appropriate for CA	Advantages	Disadvantages	Project Implementation Example
Capping	Containment	$$	Low-Medium	Fast	Yes	Effective, Ideal for low hydrodynamic flows	Does not remove Hg, possible remobilization of sediments during installaion	Almaden Lake, San Jose (CA)
Dredging	Removal	$$$	High	Fast	Yes	Ideal for highly contaminated sites	Invasive, possible remobilization, requires constant monitoring to ensure efficacy	Minamata Bay, Japan
Hypolimnetic Oxygenation	Prevents Methylation	$$	Low-Medium	Medium	Yes	Maintain cool water temperatures, high DO levels	Cannot overcome oxygen defecit, does not remove Hg from a system	Stevens Creek Reservoir, Guadalupe Reservoir, Almaden Reservoir, Calero Reservoir (CA)
Nitrate Addition	Prevents Methylation	$	Low-Medium	Medium	No	Favors growth of denitrifying bacteria, non Hg methylators	Can cause eutrophication, pollutes drinking water	Onondaga Lake (NY)
Phytoremediation	Removal	$	Medium-High	Slow	Possibly	Non invasive, removes metals other than Hg, garners public support, effective	Few species will sequester Hg, risk introducing invasive/non-native species into aquatic systems	Tapajos Lake, Negro Lake, Amazon River, Brazil

The following criteria were used to analyze each remediation method:

1. Type of Treatment
2. Cost (If applicable)
3. Level of Contamination
4. Time Scale to Decontamination/Mercury Control
5. Appropriate for California
6. Advantages
7. Disadvantages

Chemical additions, like calcium nitrate, have been a novel approach to control the methylation and release of mercury within aquatic systems on the East Coast. A number of pilot studies have been successful in New York and Virginia, but nitrate studies have not been conducted west of the Mississippi. Remediation by nitrate addition is done by controlling redox reactions and promoting the growth of denitrifying bacteria. Results of Matthews et al. (2013) study showed successful mercury control within one summer season. However, even with its inexpensive cost, nitrate additions are not a contaminant removal method. As a whole, nitrate additions would be problematic within California since the state already has issues with eutrophication, fish kills, hypoxia in rivers and lakes, and groundwater pollution. A significant percentage of Californians depend on well water, much of which is already contaminated with

nitrate. Excess nitrate in drinking water causes a serious risk to pregnant women and children for contracting blue baby syndrome. It would be counterproductive for an environmental manager to implement this method and would be trading one issue for another. Overall, there are too many disadvantages related to nitrate additions for this method to be effective for mercury control within the State of California.

In contrast to nitrate additions, dredging is a well-established and effective method for mercury removal within aquatic systems. Dredging was successfully used to restore Minamata Bay, Japan (1970s-1990s). The total mass of mercury found within benthic sediments of the Bay were estimated to be 3.4 tons, and an average concentration of mercury in surface sediments was 3.0 mg/kg (Akito et al. 2014). This project successfully decreased total mercury concentrations from 553 mg/kg to 16 mg/kg (Akito et al. 2014). Dredging is an excellent remediation method in case of an emergency spill, in a heavily contaminated area or if used in the excavation of point source pollution, but expensive costs may prohibit its use.

Dredging is a fairly invasive removal and remediation method that can disturb underlying sediment. This remobilizes sediments into upper waters, increases turbidity, and can make methylmercury available for uptake by phytoplankton, which makes this method ideal only for highly contaminated sites. Other methods, like hypolimnetic oxygenation, capping and phytoremediation can all control the release of mercury, but are much less disruptive. In addition, dredging is also cost prohibitive for sites that have low to medium mercury contamination. The removal of one cubic meter of sediment is estimated to cost approximately $1500 (Wang et al. 2014). The excavation and disposal of one acre of contaminated soil has been estimated to cost $400,000 (Henry 2000). Clearly, for large contaminated sites, removal of sediments can be extremely expensive and cost prohibitive for many environmental managers. For highly contaminated sites, or sites that have high risk of exposure to the public the cost may be justified. However, many lakes and reservoirs in California are either smaller in size, or have lower mercury concentrations, making dredging an inadequate remediation choice. Dredging does not seem like the optimal remediation choice in most of California’s lakes and reservoirs.

Like dredging, phytoremediation is a well-tested and effective remediation method, and garners broad public support. Phytoremediation uses plant biomass to remove heavy metals from contaminated sediments to decrease their concentrations within the environment. This method has been used locally, and globally, to control a number of heavy metals aside from mercury,

including but not limited to cadmium, zinc, and arsenic (Henry 2000). It can be used to decrease any concentration of a contaminant, but is often used to treat heavily contaminated sites due to its ease of implementation and cost effectiveness.

Phytoremediation is the most cost effective method out of all remediation methods discussed in this paper. Costs can range from $60,000 to $100,000 to treat one acre of contaminated soil (50 cm in depth) while implementing other methods, can cost hundreds of thousands, if not millions of dollars (Henry 2000). Costs come from propagating or purchasing and shipping the plants to the contaminated site. Installation can be done for a minimal cost, or even be completed by staff with only minimal training and proper protective equipment.

Even with public support and the low cost, there are some serious drawbacks that need to be considered before environmental managers implement this method to control or clean up large scale mercury concentration. Phytoremediation is a very slow process. The accumulation of a heavy metal like mercury will impede a plant's natural growth. The timescale to decontaminate a site, or decrease concentrations to acceptable levels can take years if not decades to accomplish. Then, once the plant biomass has accumulated enough mercury to be deemed acceptable, the plant matter must be removed and treated as hazardous waste and stored properly. If it is not removed, the plants will decompose and the accumulated mercury will then be released back into the environment, rendering the process ineffective.

Phytoremediation may introduce non-native and invasive plant species into aquatic systems of California. There are a number of plant species that can accumulate mercury, like water hyacinths, sea rush and large leaf holly fern (Skinner et al. 2007) (Chattopadhyay et al. 2012). However, outside of their native habitat, these plants can be very invasive. This introduction can alter sensitive environments and change the ecological roles each species plays in a system. Non-native plants may grow uncontrollably, given the right conditions, out competing other species and changing ecological communities for the worse. If this method were employed in lakes and reservoirs in California, environmental managers would have to implement removal programs for the invasive plant species used for phytoremediation.

Another drawback to the implementation of phytoremediation is the fact that plants can only penetrate the first few meters of contaminated soils. Their uptake of mercury is limited to the physical reach of their root structure. Phytoremediation is not effective if there is a deep layer of contaminated sediment. Therefore, the removal of mercury would be incomplete and another

remediation method or species would have to be implemented to reach the deepest layer of contamination. Removal via phytoremediation is ideal for shallow lakes or contamination along the banks of a lake where the depth of contamination is shallow and sunlight can promote plant growth. Phytoremediation cannot be used when attempting to treat benthic soils, deep within lakes and reservoirs, since plants cannot grow at these depths.

Environmental managers will have to decide if the ecological risks associated with phytoremediation outweigh the need to decrease mercury concentrations within aquatic systems. If native plants can be used for remediation, then risks are low. Overall, phytoremediation is a low-cost method that can remove a variety of heavy metals from sediments but the benefits may end there. The method is slow and may only be effective in very shallow waters, and in most cases, would require a second method to remove mercury from deeper sediments. After the uptake of mercury, plant biomass must be treated as hazardous waste and properly disposed. Finally, further research is necessary to identify, or genetically modify mercury accumulators that are endemic to California to avoid the introduction of invasive plant species. Phytoremediation may be a remediation option in limited cases, but within the State of California it should be implemented with caution.

Like dredging and phytoremediation, aqueous capping is a well-tested and effective method for mercury control. Materials like sand, gravel or geotextile fabrics isolate contaminated sediments from ambient waters, preventing the release of mercury into the food web. Methylmercury can be sorbed to these materials, preventing their escape into ambient waters. Even with highly sorptive materials, methylmercury can still escape through the cap if it is punctured. This can occur through bioturbation and activity of benthic organisms or remobilization during high hydrodynamic flows, like strong groundwater currents, storms, tides or human activity. In this case, it is imperative that the cap be at least 20 cm thick to reduce the risk of puncture and remobilization (Ndungu et al. 2016). Capping is ideal for containing a range of low to medium mercury concentrations. Capping is also a viable method for lakes or reservoirs small in size. The materials, labor and installation expenses can become cumbersome and cost prohibitive, if large areas need to be capped (Henry 2000).

Implementing hypolimnetic oxygenation as a method to control the release of methylmercury in California lakes and reservoirs is the least problematic and most promising method discussed in this paper. HOS systems have already been successfully installed and are a

proven method located in four lakes in the Guadalupe River watershed, San Jose, California (McCord et al. 2016). These lakes are contaminated from mercury tailings and mining activities from New Almaden Quicksilver mine.

Using an HOS system presents to control the release of mercury into ambient waters presents a large number of benefits. The most important benefit is that abiotic conditions prevents mercury bioaccumulation in fish and other aquatic biota, by preventing the methylation and subsequent release of mercury into the food web. Furthermore, an oxygenated hypolimnion prevents sulfate and iron reducing bacteria from methylating mercury.

Equally advantageous is the fact that HOS causes no ecological harm to the body of water being treated. In fact, HOS systems increase dissolved oxygen levels and decrease ambient water temperatures, which fish and aquatic plants need to survive. This improves overall abiotic conditions, keeps lakes oxygenated, while still maintaining cool temperatures that stratification sportfish species and consumable fish species need to survive even in summer months. Also, increased DO levels and cool temperatures benefit downstream habitats and improve drinking water quality if reservoirs are using this as potable.

The benefits to both in-lake and downstream water quality make HOS the ideal choice for environmental managers when compared to other remediation techniques. HOS does not cause remobilization of mercury like capping or dredging. It is a much less invasive technique and does not damage benthic systems like capping does. It does not subject to the surrounding ecosystem to an aggressive invasive plant species like the phytoremediation method.

In terms of cost, installing an HOS system is not the cheapest method, nor is it the most expensive. Expenses relating to this method include the purchase of machinery, installation cost, energy requirements and purchase of liquid or gaseous oxygen, which costs about $100/ton (Moore et al. 2016). While the initial equipment costs of HOS are high, it should be viewed as an investment for the community that uses the lake for recreation and for improvement of aquatic environments. HOS has the added bonus of limited energy requirements. The system only needs to be run 6-8 months out of the year. Lakes and SRB’s in the benthic sediments are not as biologically active during the winter months and do not produce as much methylmercury. Lakes and reservoirs during the winter also have a more even distribution due to mixing. Mixing results in homogenized lake layers, increased levels of DO and lower temperatures, preventing anoxic conditions in the benthic layer.

Unlike dredging or phytoremediation, an HOS system does not remove mercury from an already contaminated lake or reservoir. However, it does prevent it from being methylated by controlling abiotic conditions within an aquatic system. In order for this remediation method to be most effective, it should be implemented before the spring turnover and lake stratification occurs. This will help prevent hypoxic conditions in the hypolimnion and deliver an adequate concentration of oxygen. However, these systems should not be viewed as a way to turn a hypoxic lake into an oxic lake. HOS systems are designed to deliver a set concentration of DO. If anoxic conditions are extreme, there just is just not enough oxygen being delivered to overcome this deficit. These systems need to be implemented proactively, and not retroactively in late winter or early spring.

Another benefit of the HOS method is that the system is completely adaptable to both small and large bodies of water, depending on the selection of the delivery device. Not all devices are appropriate for all aquatic systems. For relatively shallow lakes and reservoirs (≤ 10 m) speece cones should be installed in the hypolimnion (Moore et al. 2016). Speece cones deliver high concentrations of oxygen rich waters over a smaller area of sediments. Also, they are more cost effective compared to implementing them over a large area. Deeper lakes and reservoirs (≥14m) should have line diffusers installed. Line diffusers can cover and oxygenate a much larger area than speece cones can and are economically feasible for this purpose (Moore et al. 2016).

Implementing line diffusers can also create weak circulation within the hypolimnion, without destratifying layers of a lake. This can prevent methylmercury in the water column from being brought to the surface where it then becomes bioavailable to phytoplankton. The velocity of outflow and bubble size can be adjusted to suit a variety of water quality needs. So much so that the released plume from the device rises to the top of the hypolimnion, spreads out horizontally, and then becomes negatively buoyant and will sink down to the benthic layer of the lake, oxygenating the bottom. The variety, flexibility, and control over these devices makes it an ideal choice when attempting to control the release of mercury into aquatic systems.

Over time, scientists and engineers have developed a variety of methods to control the release of mercury and minimize risks of exposure in both wildlife and humans. Each method addressed in this paper is effective, in that it either removes mercury from a system, or prevents the process of methylation. However, there is no one infallible remediation method applicable to

all freshwater systems in the State of California. To choose the most appropriate method, or combination of methods, environmental managers will have to prioritize their own criteria to determine the most appropriate method for their site.

Recommendations

Implement Hypolimnetic Oxygenation for Effective Mercury Control

A comprehensive approach is necessary to achieve effective remediation control of methylmercury contamination within lakes and reservoirs. There are three general options to address mercury remediation: control the process of methylation of mercury found in aquatic systems, prevent the introduction of mercury into the environment in the first place; and minimize exposure risk to humans by preventing consumption of mercury contaminated fish. The recommendations suggested here will attempt to provide a variety of options for environmental managers, policy makers and the general public.

The most efficient way to prevent methylation of mercury in an aquatic system is to implement hypolimnetic oxygenation. HOS is the least problematic remediation choice when choosing a method to control the release of mercury into aquatic systems compared to the other four methods I analyzed. HOS controls the release of mercury, and prevents its' methylation and bioavailability. The increase of dissolved oxygen prevents hypoxic conditions, therefore inhibiting the growth of sulfate reducing bacteria. This then prevents the methylation and release of methylmercury into the food web.

The in situ aqueous capping method physically isolates it from ambient water, yet still allows for the production of methylmercury underneath the cap. There is a risk of puncturing the cap and subsequent mercury release into ambient waters. However, capping can still be a viable method to control mercury if the cap is made of proper material and thick enough to prevent puncture. In order to be extremely effective, continuous monitoring is necessary to determine if the mercury is contained in the aqueous cap.

HOS will not cause eutrophication and does not pollute drinking water like the nitrate additions method. The use of nitrate as a remediation method to control the release of mercury into the environment is not recommended in California. Excess nitrate in aquatic systems in California can cause eutrophication and fish kills, thereby decreasing the oxygen levels in a lake and creating conditions for sulfate reducing bacteria to flourish and methylate mercury. Successful pilot studies have been conducted east of the Mississippi River where phosphorous is the limiting nutrient, however, studies of this kind have been conducted on the West Coast where nitrogen is the limiting nutrient. Further small-scale studies need to be conducted to determine

additional mechanisms of mercury control and why nitrate additions are a viable option based on geographic region without creating eutrophication.

Dredging is a viable method for cleaning up point source pollution or sites with a high risk of direct mercury exposure to the public. However, the majority of lakes in the State of California do not fall into this category. Further, the hydraulic and mechanical removal of sediment comes at a high risk of remobilizing sediment contaminated with mercury. This risk of mercury remobilization and the high cost of dredging make other remediation methods advisable.

Phytoremediation can be used to remove mercury from a contaminated system over time. However, this method risks the introduction of invasive plant species into endemic California ecosystems. HOS implementation does not increase this risk. Plant species that accumulate mercury, like the water hyacinth and sea rush, can be invasive and problematic if not controlled properly. Although HOS does not remove mercury from a system like phytoremediation does. If implemented proactively, can prevent mercury from entering the food web by arresting the production of methylmercury. Installing and operating an HOS system is much more expensive than phytoremediation due to the purchase of an HOS device, its installation and cost of energy use. While costs for phytoremediation only include the cost of propagating the plants and their transport. Installation of plants can be conducted by trained volunteers, with minimal cost. For these reasons, hypolimnetic oxygenation is the ideal remediation method to control mercury release into freshwater aquatic systems.

Statewide Ranking of Contaminated Lakes

Realistically, there is not enough State funding for every mercury-contaminated lake to be completely remediated. I recommend that each lake or reservoir should be ranked and prioritized for remediation action. Ranking criteria should be weighted and based on the following: volume of each lake, the level of mercury contamination (high, medium, low), presence of sport or consumable fish and their population size, proximity to vulnerable communities that rely on subsistence fishing, and high hydrodynamic flows (risk of mercury transport). Site assessments should then be conducted and a statewide report would be compiled, ranking each lake or reservoir from highest remediation action, to the lowest. Using these criteria, an additional geospatial analysis should be conducted to identify lakes with high priority for remediation, and

their proximity to vulnerable communities that depend on subsistence fishing. These analyses and site visits could help environmental managers to target remediation actions and identify communities most at risk for mercury exposure and mitigate these risks.

Monitor Mercury Concentrations at Lower Trophic Levels

Traditionally, mercury concentrations are analyzed from fish species relatively high on the food chain or taken from sediment cores. Mercury concentrations found within fish tissues give a relatively accurate proxy of how much methylmercury is in biota in an aquatic system (McCord et al. 2016). However, monitoring methylmercury concentrations at lower trophic levels would give more accurate concentrations within biota in a lake. Monitoring and analyzing mercury concentrations of species lower on the food chain will quickly tell environmental managers if their remediation methods are effective (McCord et al. 2016). If there is little to no mercury uptake in these species, that is an indicator that the remediation methods are working and mercury is not becoming bioavailable or accumulating (McCord et al. 2016). By monitoring methylmercury concentrations within various organisms, like benthic invertebrates, or even phytoplankton, researchers can quickly identify whether or not methylmercury is bioavailable. Using fish tissue as a way to identify methylmercury concentrations is a delayed monitoring method. It takes months to years for methylmercury to bioaccumulate up the food chain and fish to be large enough to obtain appropriate tissue samples (Gochfeld 2003). Further research is necessary to improve methodology to accurately for accurately assessing methylmercury concentrations in an aquatic system. In addition to this, the mechanisms and reasons for methylmercury uptake by phytoplankton is still unknown. These processes need to be elucidated first, before methods can be improved. In the interim, monitoring methylmercury concentrations in benthic invertebrate species might be a viable substitute.

Reduce Atmospheric Mercury Emissions

Globally, the majority of mercury that is released into the environment comes from atmospheric emissions. By decreasing atmospheric mercury emissions, the amount of mercury that is deposited into watersheds decreases. Curbing global mercury emissions will prevent mercury from entering watersheds and bioaccumulating in aquatic organisms. Reducing atmospheric

emissions will therefore reduce the amount of methylmercury that is bioaccumulated in aquatic organisms. The majority of mercury atmospheric emissions that are deposited onto the State of California come from eastern Asia (Steding and Flegal 2002). Reducing these emissions will reduce the amount of mercury that is deposited in the State of California.

Mercury emissions can be controlled or decreased in several ways. Switching to a more environmentally friendly energy source would also lower atmospheric emissions of mercury both locally and globally. Emerging energy markets of hydropower, solar, nuclear, and wind energy are increasing in popularity. Currently, China has the largest atmospheric mercury emissions by country per capita (Hu and Cheng 2016). This phenomenon will eventually decrease the dependence on coal-combustion for energy and displace coal-fired energy, decrease mercury emissions, while still supporting a country's energy growth needs. Decreasing emissions in both developing and developed countries will collectively decrease mercury emissions, mercury transport and deposition. In China, coal fired power generation is projected to decrease from 54% to 35% by 2030 due to the switch to alternative energy (Hu and Cheng 2016). This phenomenon will eventually decrease the dependence on coal-combustion for energy and displace coal-fired energy, decrease mercury emissions, while still supporting a country's energy growth and needs. California estimates that 29 percent of its electricity sales in 2016 were met by renewable energy from wind, solar, geothermal, biomass and hydroelectric (CEC 2017). And by 2030, 50% of its retail sales will come from renewable energy (CEC 2017). This demonstrates a significant shift away from fossil fuel dependence. Decreasing fossil fuel use will decrease atmospheric mercury deposition. Atmospheric mercury can stay suspended for six months to two years before being deposited to the earth (Steding and Flegal 2002). This long residence time allows for wind transport and deposition of mercury far away from the point source. Much of California's atmospheric mercury that is deposited here comes from eastern Asia, specifically China. Controlling the release of mercury, by switching to alternative energies and decreasing dependence on fossil fuels in China will decrease the amount of mercury deposited in California.

Until alternative energies are the primary source of power, it is necessary to implement legislation to control mercury emissions from stationary coal burning power plants. About 9.9 percent of all energy consumed in the U.S. in 2015 came from renewable sources and in 2012 the U.S. was the world's largest consumer of renewable energy (IER 2017). However, a significant increase in consumption and production of renewable energy is necessary to combat fossil fuel

dependence. The Environmental Protection Agency (EPA) in December of 2011 enacted a rule that would decrease emissions of mercury and other hazardous air pollutants from both existing and new coal and oil based power plants with an energy capacity greater than 25 megawatts (EPA 2017). The Mercury and Air Toxics Standards (MATS) was the first national standard to reduce mercury and other toxic air pollutants since the 1990 Clean Air Act (EPA, 2017). Approximately 1400 coal and oil fired power plants in the U.S. are active, a majority of which do not control their emissions of toxic pollutants (EPA 2017). Currently 50% of mercury emissions from the U.S. come from power plants and more stringent mercury control is necessary. This stringent ruling will help prevent 90% of mercury from stationary coal burning power plants from being emitted, reduce 88% of acid gas emissions and reduce sulfur dioxide emissions by 41% (EPA 2017). This single regulatory action is a strong example of stricter emission controls and prevention of mercury releases into the environment. Ideally this ruling could be used as an example for other countries who need to adopt stricter laws concerning mercury emissions, like Brazil, China and India.

Advanced pollution control equipment should be installed and implemented to control mercury releases in coal-based power plants. An estimated 44% of all coal fired power plants lack advanced pollution control equipment (EPA 2017). Installing advanced control methods would decrease emissions of harmful air pollutants, mercury included. Air pollution control devices like fabric filters, electrostatic precipitators and activated carbon injection, can all capture a variety of different mercury species from coal fired power plant emissions (Table 4). These advanced control devices also have the added benefit of removing other hazardous air pollutants, like NO_x, SO_x, and particulate matter (Hu and Cheng 2016). Combined actions of legislation and advanced pollution control devices would have a positive impact on human health and the environment.

Table 4. Summary Table of Advanced Air Pollution Control Devices (Hu and Cheng 2016)

Control measure/device	Intended air pollutant control	Impact on mercury removal
Combustion controls	NO_X, dioxins, and furans	Mercury can be controlled as a co-benefit
Coal washing	Particulate matter and SO_2	Significant fractions of mercury are also removed from the coal
Electrostatic precipitator	Particulate matter	Mercury (primarily particulate mercury) can be removed as a co-benefit
Fabric filter	Particulate matter	Mercury (primarily particulate mercury) can be removed as a co-benefit
Cyclone	Particulate matter	Mercury (primarily particulate mercury) can be removed as a co-benefit
Dry scrubber	Acidic gases (SO_2 and HCl), and some particulate matter (when combined with downstream particulate matter control devices)	Can remove some mercury as a co-benefit
Wet scrubber	Acidic gases (SO_2 and HCl), and some particulate matter	Can remove some mercury as a co-benefit
Dry sorbent injection	Acidic gases (SO_2 and HCl), and some NO_X	Can remove some mercury as a co-benefit
Wet flue gas desulfurization	SO_2	Mercury (primarily oxidized mercury) can be removed as a co-benefit
Selective catalytic reduction	NO_X	Mercury can be removed (primarily through causing mercury oxidation) as a co-benefit
Selective non-catalytic reduction	NO_X	Has little or no effect on mercury emission reduction
Activated carbon injection	Mercury, dioxins, and furans	Mercury can be effectively removed (primarily through adsorption) as a co-benefit or as the target pollutant

Consumption of Fish Species Lower on the Food Chain

Consuming fish as a low fat, high protein animal meat has dietary benefits, including but not limited to intake of omega 3 fatty acids that help cell development in the body and are essential for brain development in young children (Wenstrom 2014). However, due to the increase of mercury contamination in freshwater systems and bioaccumulation, there is the risk of exposure to mercury in humans when eating fish. Eating fish or shellfish that is found lower on the food chain will reduce mercury intake. The people who subsist on freshwater fish often are subsistence anglers, immigrant communities, or in low socioeconomic groups. They depend on easily accessible freshwater fish to feed themselves or their families. Fish found in freshwater systems are an easy and inexpensive animal protein.

Although all fish found in mercury-contaminated lakes and reservoirs are exposed to mercury, the tertiary species accumulate the highest levels of mercury in their tissues. Therefore, eating smaller fish lower in the food chain will minimize the intake and exposure to mercury, reducing the risk of adverse health effects. Generally speaking, older, larger fish have lived longer and have accumulated higher concentrations of mercury in their tissues. Consequently, eating smaller sized fish can reduce a person's mercury intake.

The California Office of Environmental Health Hazard Assessment (OEHHA) has published a number of online documents and interactive tools that can aid the general public about identifying species of fish that are suitable to eat and how often these species can be consumed with a minimal risk of mercury exposure. The Fish Consumption Advisories and Safe

Eating Guidelines tool can be found at: https://oehha.ca.gov/fish/advisories. People who consume fish can navigate to this tool online and look up their location by county, waterbodies found in California, and fish species (Figure 9). After typing these data into the tool, the tool shows a tabular breakdown of the fish species by location that are safe to consume, as well as any subsequent fish consumption advisories or warnings. The fish consumption advisories and Safe Eating navigation tool can also be accessed via a mobile device with access to the internet. This tool is incredibly powerful, allowing the general public to become educated and make smarter dietary choices, thereby reducing their overall exposure to mercury.

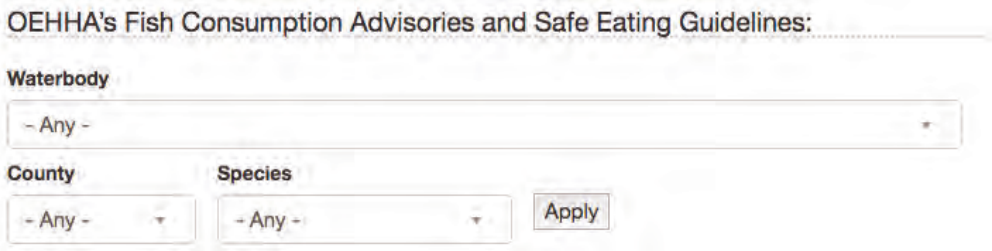


Figure 11. Fish consumption advisories and Safe Eating navigation tool (CalEPA 2016)

In order to reduce this risk, the public should be educated to eat fish low on the food chain, or to cut out fish consumption entirely for a vegetarian or vegan diet, if economically feasible. Both the U.S. Food and Drug Administration and the Environmental Protection Agency published nation-wide advisory as of 2004 (FDA 2017). This education program is still relevant today. These consumption advisories have been, and will continue to reduce the risk of exposure to mercury in humans and sensitive groups.

The advisory recommends that children, young women, or women that may become pregnant, avoid fish that contain high levels of mercury. The three-main recommendations that stem from this advisory are the following:

1. Do not eat shark, swordfish, king mackerel or tilefish. They have high levels of methylmercury
2. On average eat two means a week consisting of a variety of fish and shellfish that have low methylmercury concentrations
3. Adhere to local fish consumption advisories before consuming fish in local lakes, rivers and coastal areas

a. If no advice is available, on average, eat one meal per week of fish that is caught in local waters, and do not consume any other fish during that week
    i. One serving of fish is considered approximately the width and thickness of the palm of a hand. Therefore, an adult serving of fish should be larger and thicker than a serving for a child (Figure 11).



Figure 12. Approximate serving size of fish for children and adults (CalEPA 2017)

In addition to adhering to the FDA and EPA fish consumption advisories, it is also recommended to increase signage, warning the public about the dangers of mercury consumption in contaminated fish. In addition to this, the number of languages found on each sign should be increased. Many subsistence anglers either do not speak English, or English is not their first language. Overcoming this language barrier will make fish consumption advisories more accessible to the public. Increasing the number of languages and number of signs will educate the public and reduce the risk of exposure due to consumption of contaminated fish in freshwater systems.

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From: Jeff Watt <jrwatt007@gmail.com>
Sent: Wednesday, January 15, 2020 8:15 AM
To: Michael Martin
Subject: Comment on Lake Almaden DEIS--Global Warming

Mike,

Here is a comment for the DEIS:

Consider Impact of global warming on the revised lake/creek specifically flood and drought. Anticipate that greater than 100 year frequency floods will occur. A planned discharge (spillway) point might make sense. Anticipate that droughts will require reduction of some or all of the supply water to the revised lake. Due lower depth and less water the water level will drop much faster than in the current lake. The creek will also be dry for longer periods. Aesthetics of the creek and lake walls and bottom should consider this. At some level the new lake may become too warm for any fish so dealing with their clean-up and disposal should also be considered.

1

2

Jeff Watt
1013 La Terrace Cir, San Jose, CA 95123

From: Jeff Watt
To: Michael Martin
Subject: Fwd: Valley Water Almaden EIR Comments
Date: Sunday, January 26, 2020 7:48:24 PM

Valley Water

Dear Michael,

In response to the request for comments on the DEIR issued by Valley Water(VW) for the proposed Lake Almaden project please consider the following recommendations:

In Situ Capping

Lake Almaden was used as a specific example where in situ capping (adding gravel or other material without draining the lake) is recommended in the publication "Remediation Strategies for Mercury Contaminated Lakes and Reservoirs Within the State of California".

In situ capping of sediments in lieu of excavation and removal will:

- Significantly speed up the project timeline (one year allocation for current method);
- Reduce the dust and noise impact to surrounding neighborhoods during construction;
- Eliminate the need to remove, transport, and dispose the toxic bottom sediments;
- Prevent potential project delays and costs due to unknown lake bottom contaminates;
- Eliminate the need to kill/relocate the existing fish and waterfowl populations.

1

Creek Diversion

To achieve flood control objectives VW has constructed levees, improved flood channels, and provided diversion dams like that used just upstream of Lake Almaden. The proposed creek channel is approximately 200 ft wide to allow it to fully retain a flow expected only once in 100 years. Temporary diversion and later replacement of high flows into the lake will:

- Significantly reduce the width of the new creek channel and widen the lake improving the user experience and views--especially from the West;
-

2

Trap sediments in the lake to improve downstream water quality and fish habitat when the water is returned to the creek.

2 cont.

Alternate Methods for Seagull Containment

VW proposes constructing a second island to discourage seagulls. The publication Exclusions of Gulls from Reservoirs in Orange County California documents the use of obstructions to discourage seagull flocks from using the reservoir. Alternate barriers could be used here, for example solar powered sprinklers used in a similar manner to the water circulating bees to discourage seagulls. Views of both sides of the lake would also be improved and aeration of the lake would improve water quality.

3

Document Commitment to Supply Water

The new lake will be entirely dependent on the diversion of water VW purchases to recharge aquifers. With a proposed volume of approximately one-third of the current lake a cutoff of supply will quickly impact the health of the lake.

VW should document in the EIR their prioritization plan to keep the lake healthy during a drought when supplies are limited.

4

Managing Geese with the Lake Changes and in Adjacent Neighborhoods Prior to Construction

A plan for managing the existing resident geese population should be developed to minimize the impact of geese intrusion on surrounding neighbors. The lake shore should include rocks and appropriate plantings to discourage geese from using the lake as outlined in DNR: Solutions to Problem Geese.

5

Please let me know if I can any additional information to support these recommendations.

Jeff Watt
1013 La Terrace Circle
426 614 5926

https://repository.usfca.edu/cgi/viewcontent.cgi?article=1713&context=capstone (link to USF Study)
https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1000&context=vpc9 (link to gull study)
https://www.in.gov/dnr/fishwild/3002.htm (link to geese study)

From: marsh <marshwhite@sbcglobal.net>
Sent: Saturday, December 28, 2019 5:23 PM
To: Michael Martin
Subject: Question on access from west side park to east side park

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